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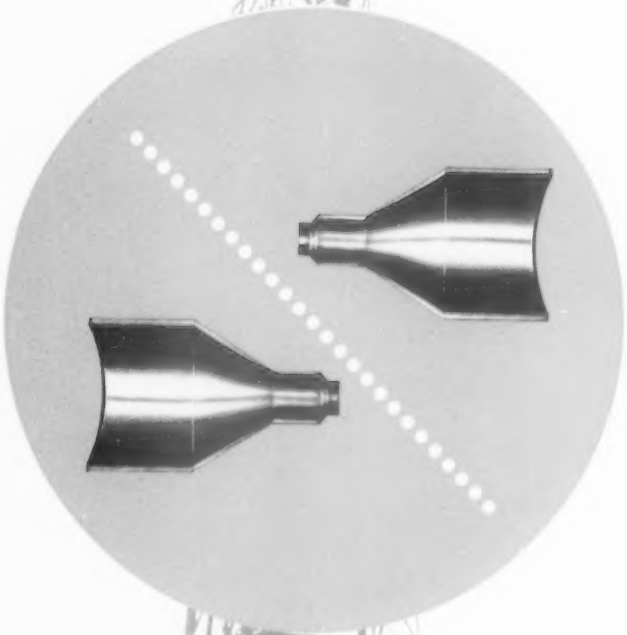

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In Brief . . .

1. DRILLING WITH AIR . . . Laughlin-Porter Drilling Co., of Midland, Tex., has employed air as drilling fluid in the drilling of surface holes in the Edwards Plateau area of West Texas. Conventional mud cannot be used for the cavernous limestone formations at the surface. A hole was drilled from surface to 585 ft. in elapsed time of about 57 hours, when using air. Cable-tool drilling of surface holes in this area requires 10 to 30 days.

2. SINCLAIR PATENT . . . In the August 10 issue The Oil and Gas Journal published an account of Magnolia Petroleum Co.'s process for increasing oil recovery by application of heat to the reservoir. Thermal oil-recovery methods have also been under investigation in laboratory and field by Sinclair Oil & Gas Co. and Sinclair Research Laboratories. Here are some of the results of that work as given in a Sinclair patent.

3. ELECTRONIC WATER CUTS . . . The percentage water cut of oil-well fluids can be measured and recovered continuously by electronic methods. The accuracy appears to be at least equal to that obtained by conventional taping and thiefing methods. Standard Oil Co. of California has tested the new electronic meter for a period of 2 years.

4. COOLING COMPRESSOR AIR . . . Evaporative cooling of the scavenging air stream on large, two-cycle gas engines has been employed by Southern Counties Gas Co. at its Blythe, Calif., compressor station. This has given encouraging results in the prevention of detonation. Elimination of detonation during the extremely hot summer months was of prime interest here since it resulted in limitation of engine load.

5. PETROCHEMICAL NOMENCLATURE . . . Growth of the petrochemical industry serves to focus attention once more on the question, "How shall the hydrocarbons be named?" This report by Mary Alexander, assistant to director of research, Universal Oil Products Co., gives in concise form recommendations for an orderly hydrocarbon nomenclature for the straight and branched-chain of hydrocarbons, olefins, acetylenes, and benzene and derivatives.

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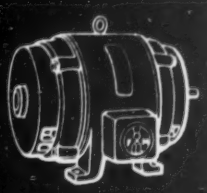
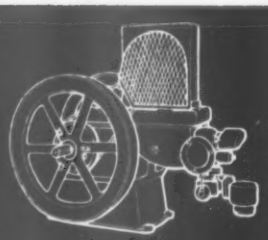
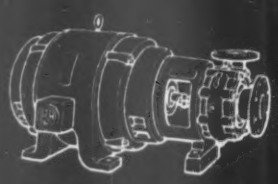


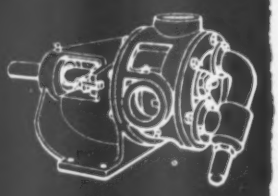
Electric Motors



ZC Engines



Builtogether Pumps

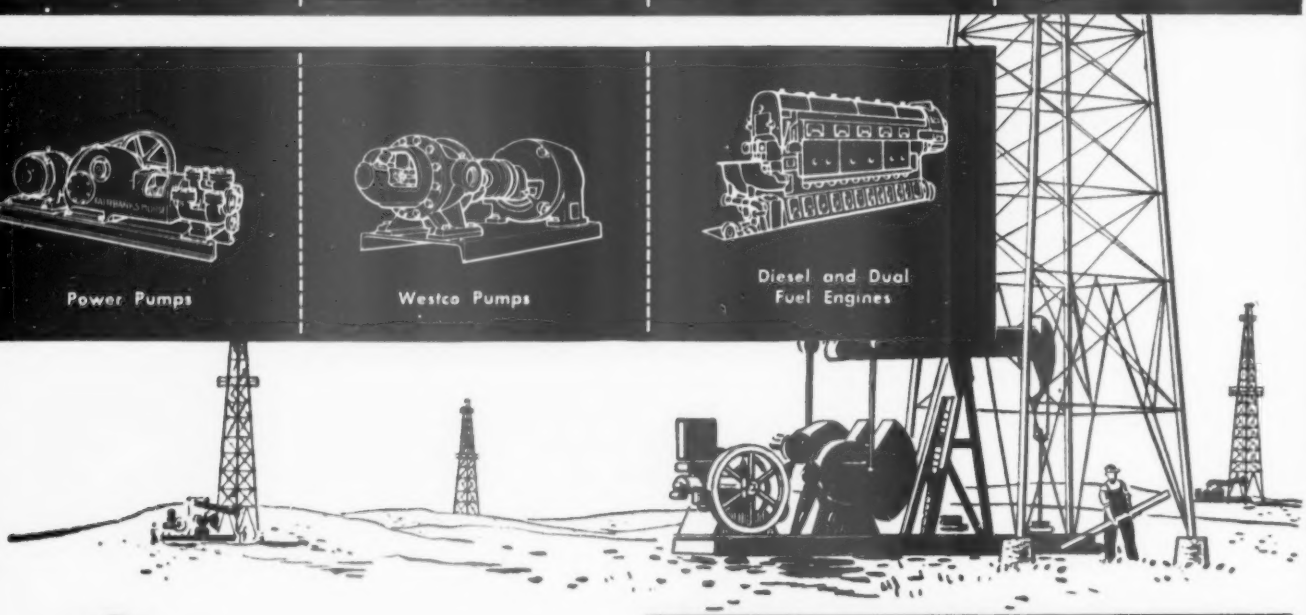


Rotary Pumps

Power Pumps

Westco Pumps

Diesel and Dual Fuel Engines



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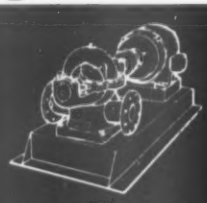
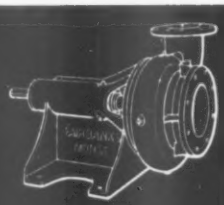


Single and Two-Stage Centrifugal Pumps



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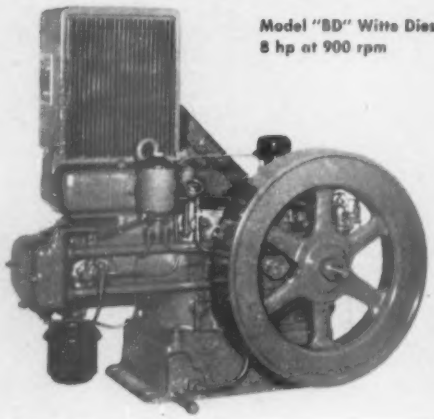
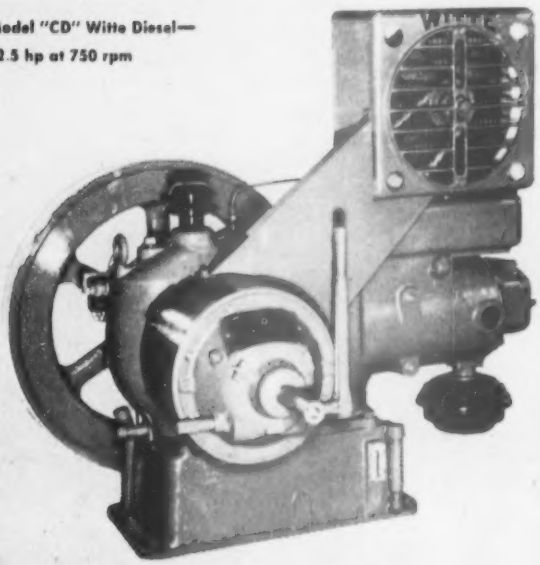


Model "BD" Witte Diesel—
8 hp at 900 rpm



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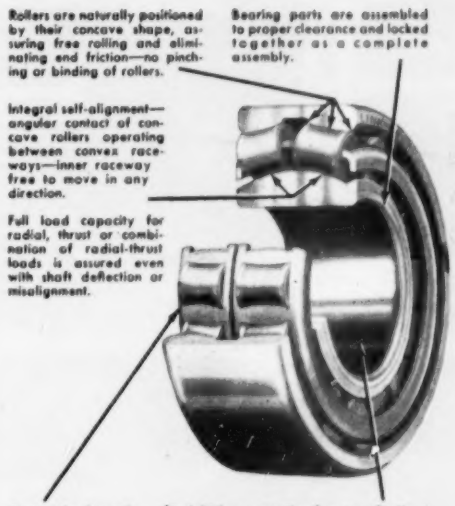
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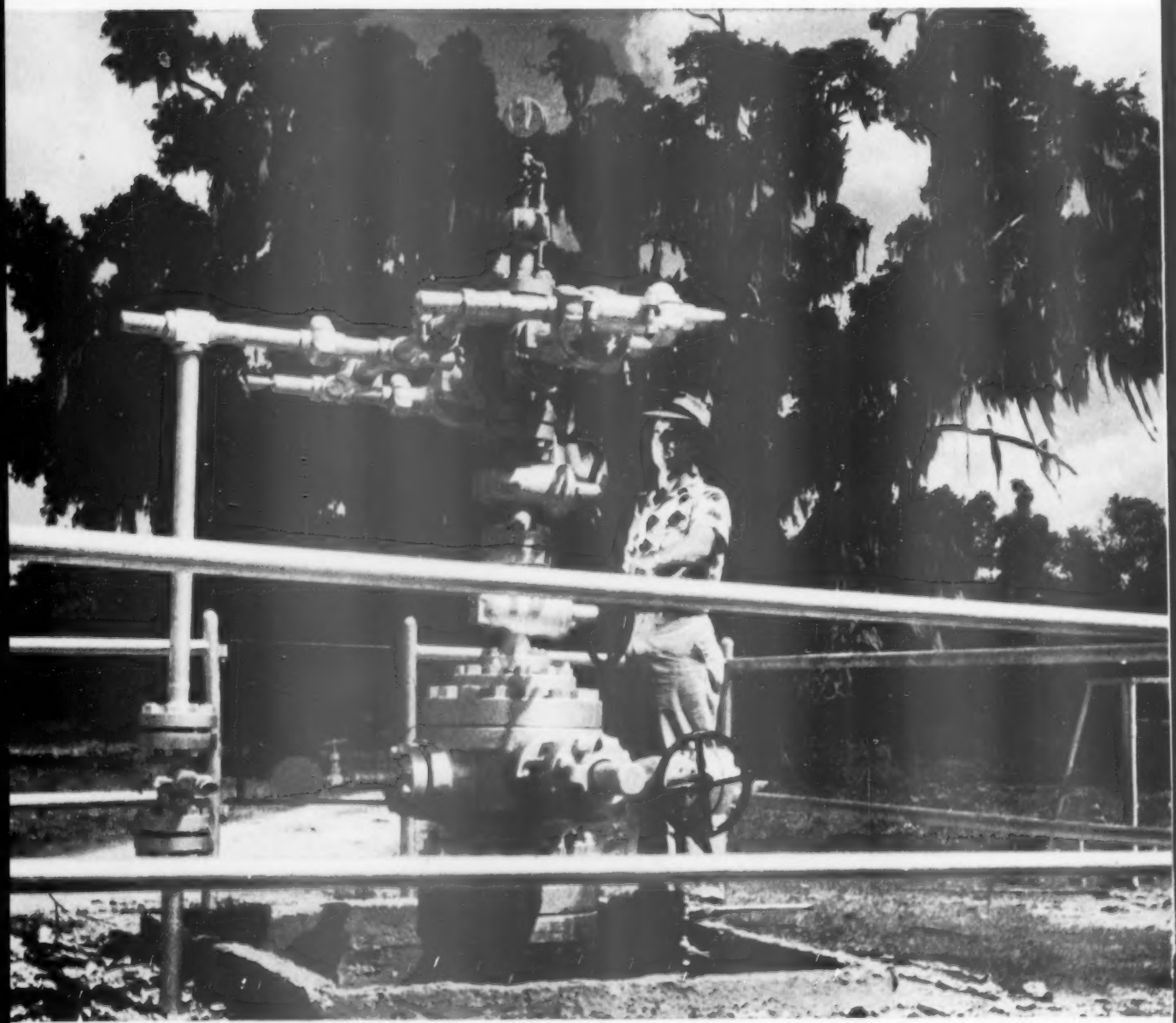

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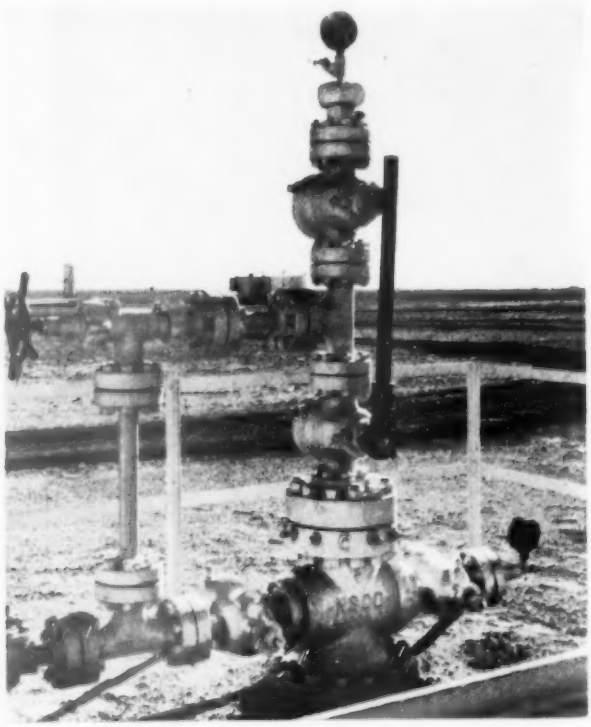

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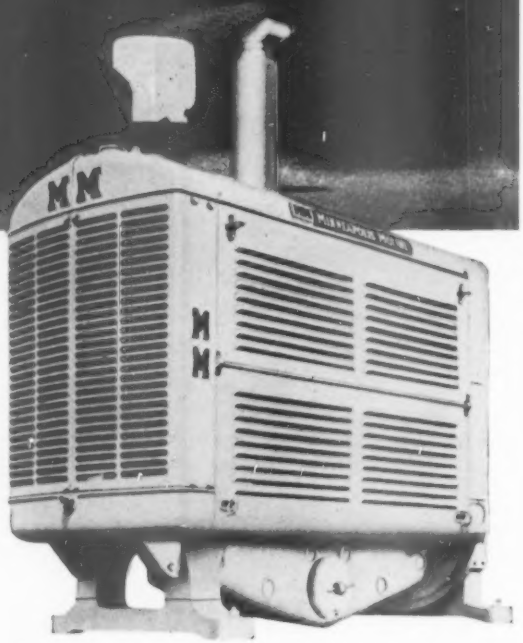

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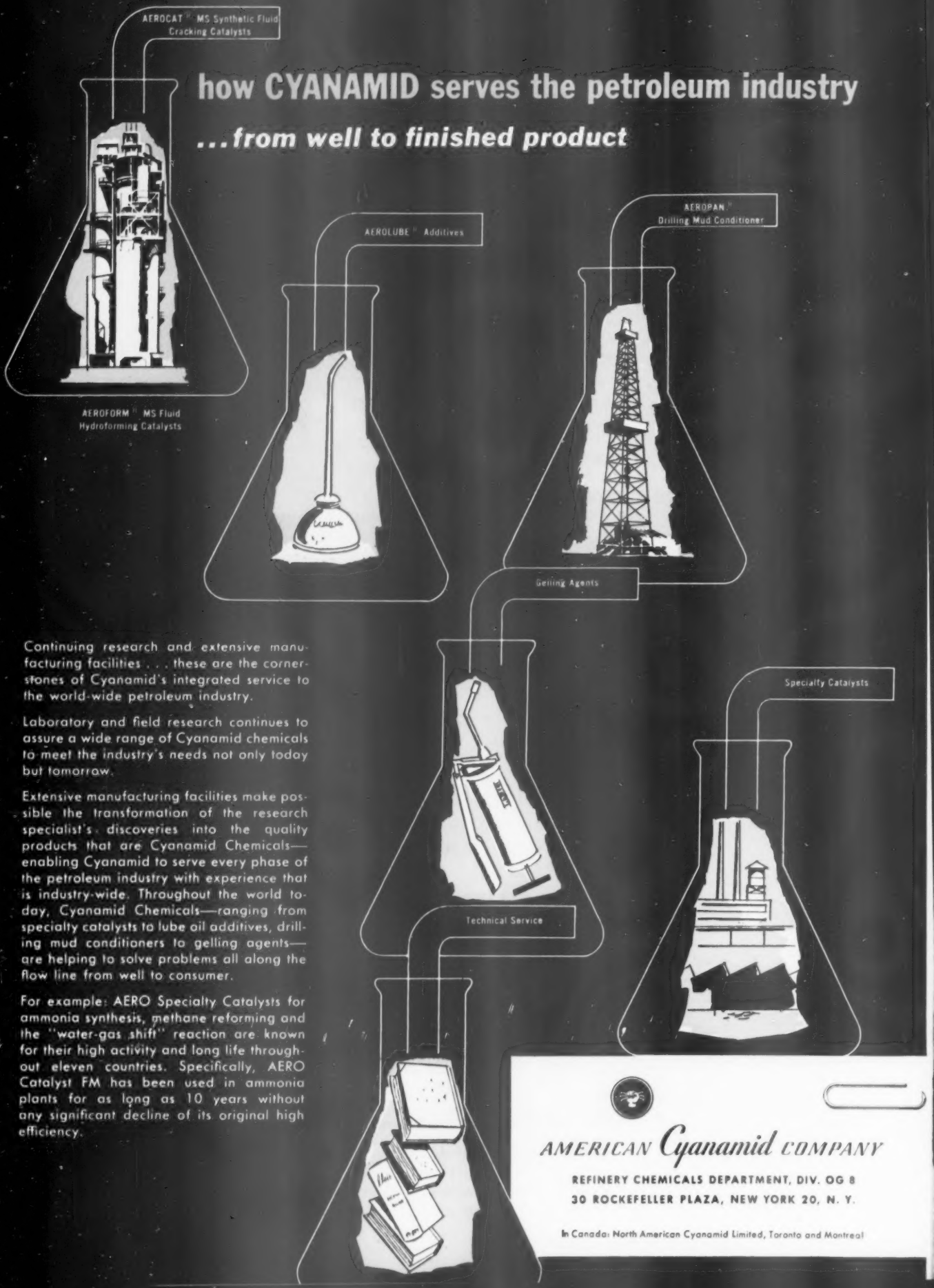

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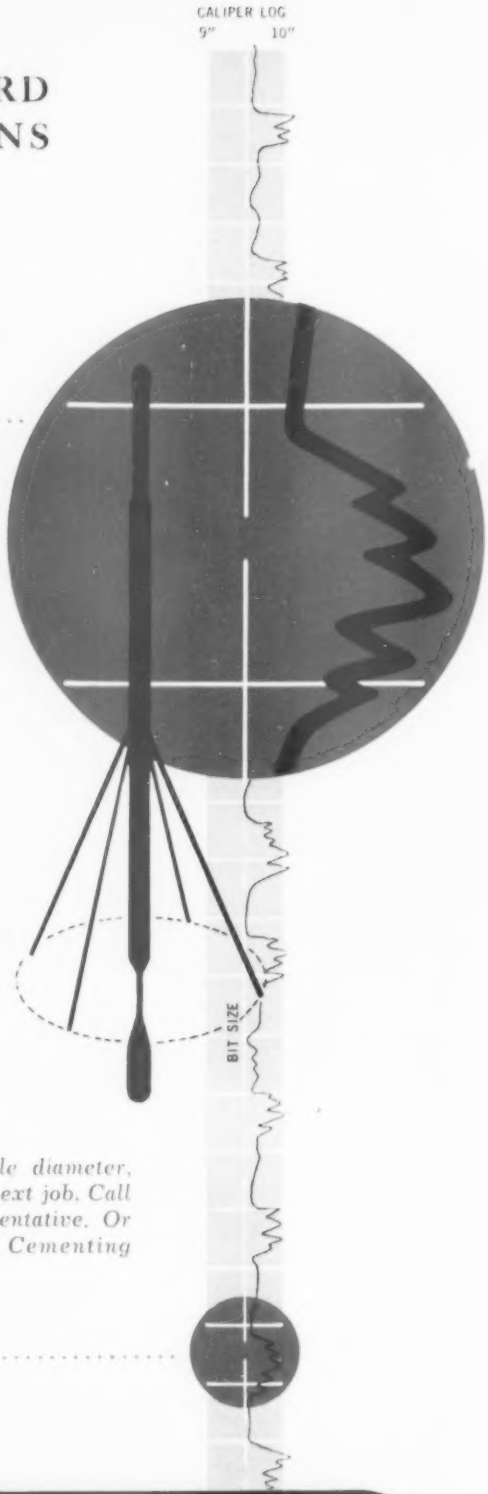

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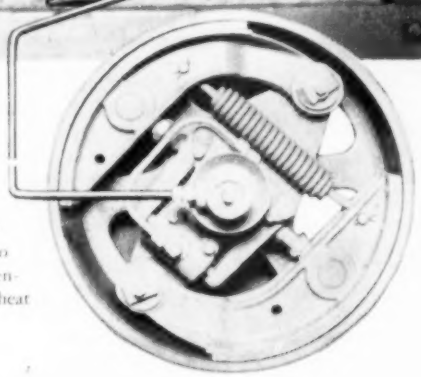

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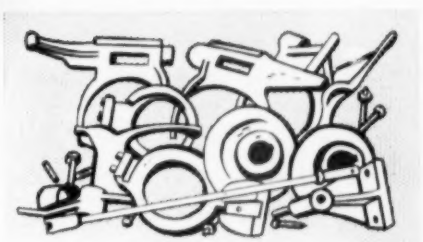

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Mobility Across country, over rough terrain, in swamps and creek beds, up banks and high hills — whatever the terrain these new treads give the 15-B and 22-B machines the footing to keep rolling — even up grades as steep as 35 percent.

Strength Back of the new tractor-type crawler is more than ten years of design and field testing. It's a modern, heavy duty tread with big, strong parts that keep going longer on punishing pipeline duty.

Mud No Problem Extra long recoil spring takes the added tension when mud jams into the treads. Open design retards caking of rollers with mud. In addition high axle clearance keeps propelling machinery up and away from mud. Positive seals protect all bearings from dust and grit.

Easier lubrication Lubricated with oil instead of grease, these crawler treads are easier to maintain. Pressure lubrication forces old oil and sediment out of bearings, assuring longer life.

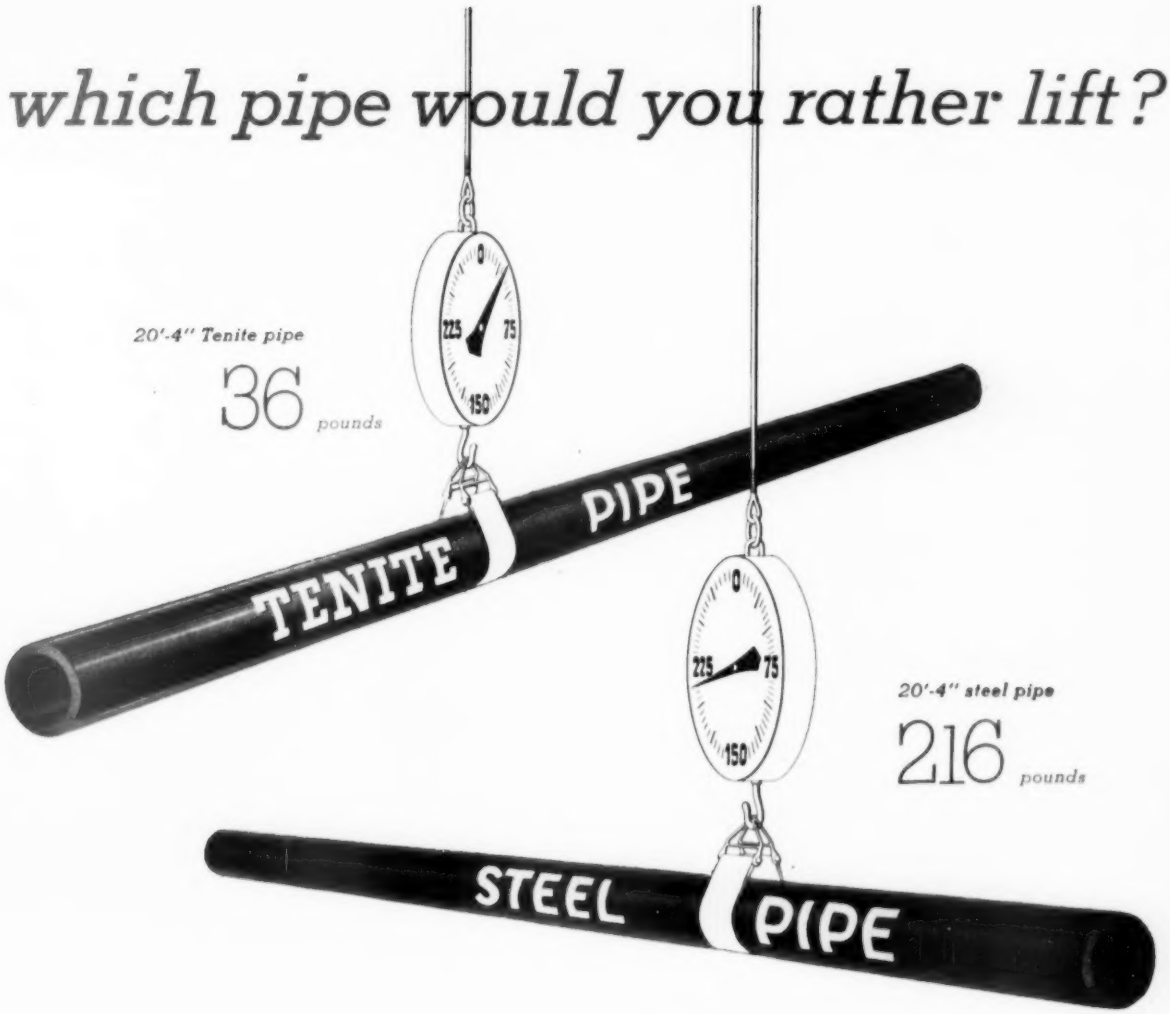
Ask your Bucyrus-Erie distributor for complete information on a 15-B or 22-B dragshovel or dragline equipped with tractor type crawlers. The facts will speak for themselves.

34E53

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY • South Milwaukee, Wisconsin

which pipe would you rather lift?



OIL men are big strong fellows . . . but regardless of how big or how strong they are . . . they all tell us that lightweight Tenite pipe is wonderful to handle.

Tenite pipe makes possible considerable savings in installation costs. For example, in a typical case, three men laid 4,000 feet of 4" Tenite pipe in a day; eight men are usually required to lay the same amount of steel pipe. *This meant a clear savings of 62% in labor costs.*

DOES NOT CORRODE . . . Extruded of butyrate, Tenite pipe is being used successfully to conduct sour crudes and salt water. The tough plastic is also unaffected by the electrolytic action of soils.

DELIVERS MORE FLUID . . . For any given head loss, Tenite pipe delivers approximately 40% more fluid than does clean steel pipe of the same diameter. This means that many oil men install a 3" Tenite pipe to do the same job which normally would require 4" steel pipe.

PARAFFIN CLOGGING MINIMIZED . . . Because of the smooth, glossy inner surface of the Tenite pipe, some lines have been in service almost 4 years without shutdown for cleaning paraffin. These same lines were formerly cleaned every three weeks.

WRITE OR SEND COUPON . . . if you too would like to avail yourself of the many advantages of Tenite pipe. We'll send technical data and names of suppliers of pipe and fittings. If you have specific problems you wish to talk over with us, our technical staff is at your service.

EASTMAN CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE

Sales representative for TENNESSEE EASTMAN COMPANY
Division of Eastman Kodak Company

TENITE

an Eastman plastic

EASTMAN CHEMICAL PRODUCTS, INC.
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Please send me further information about TENITE *Plastic Pipe*

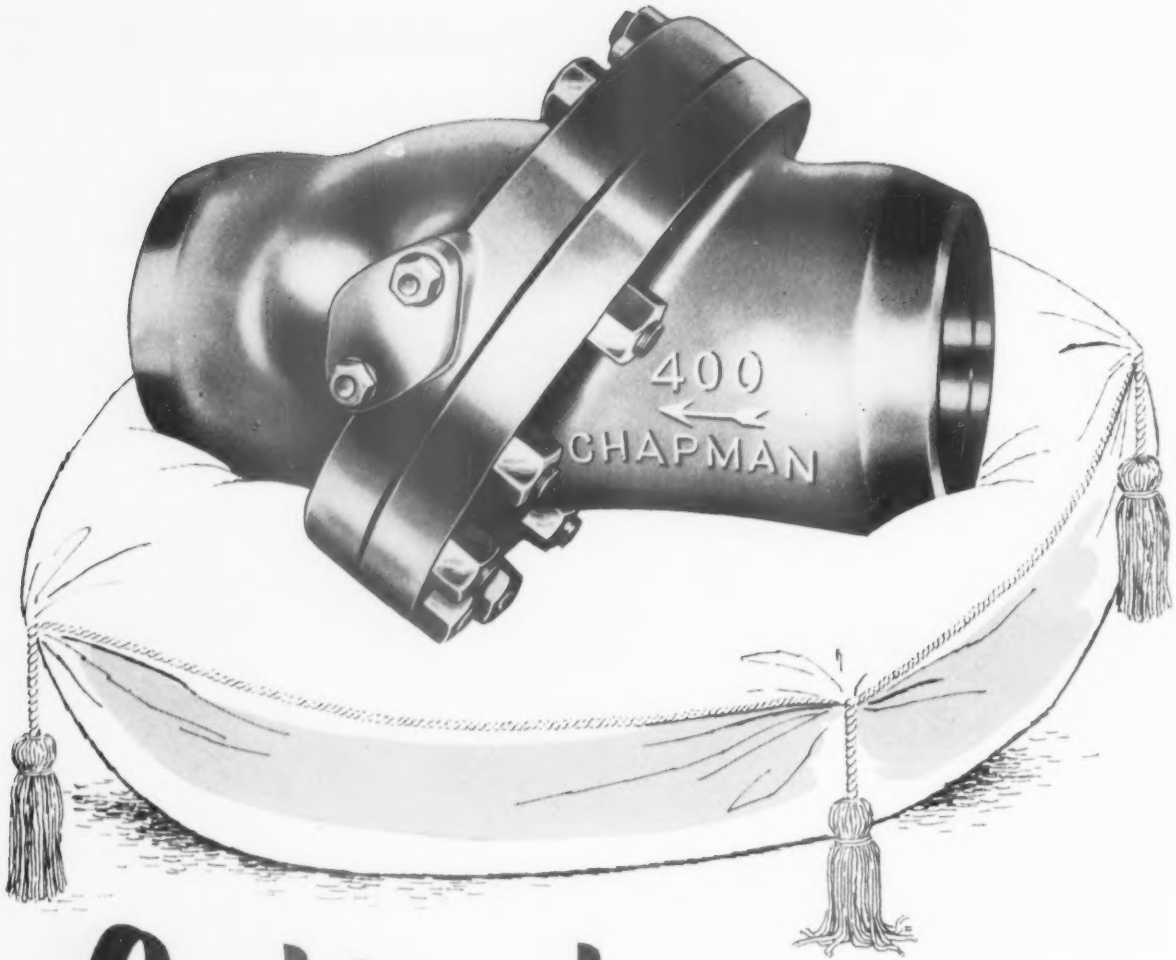
Name .....

Title .....

Company .....

Street .....

City ..... State .....



Cushioned

to a drop-tight seat...

... that's why these unique

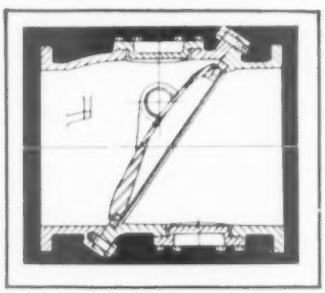
CHAPMAN

***Tilting Disc* CHECK VALVES**

cut head-loss to lowest levels

The Chapman Valve Mfg. Co.

INDIAN ORCHARD, MASSACHUSETTS

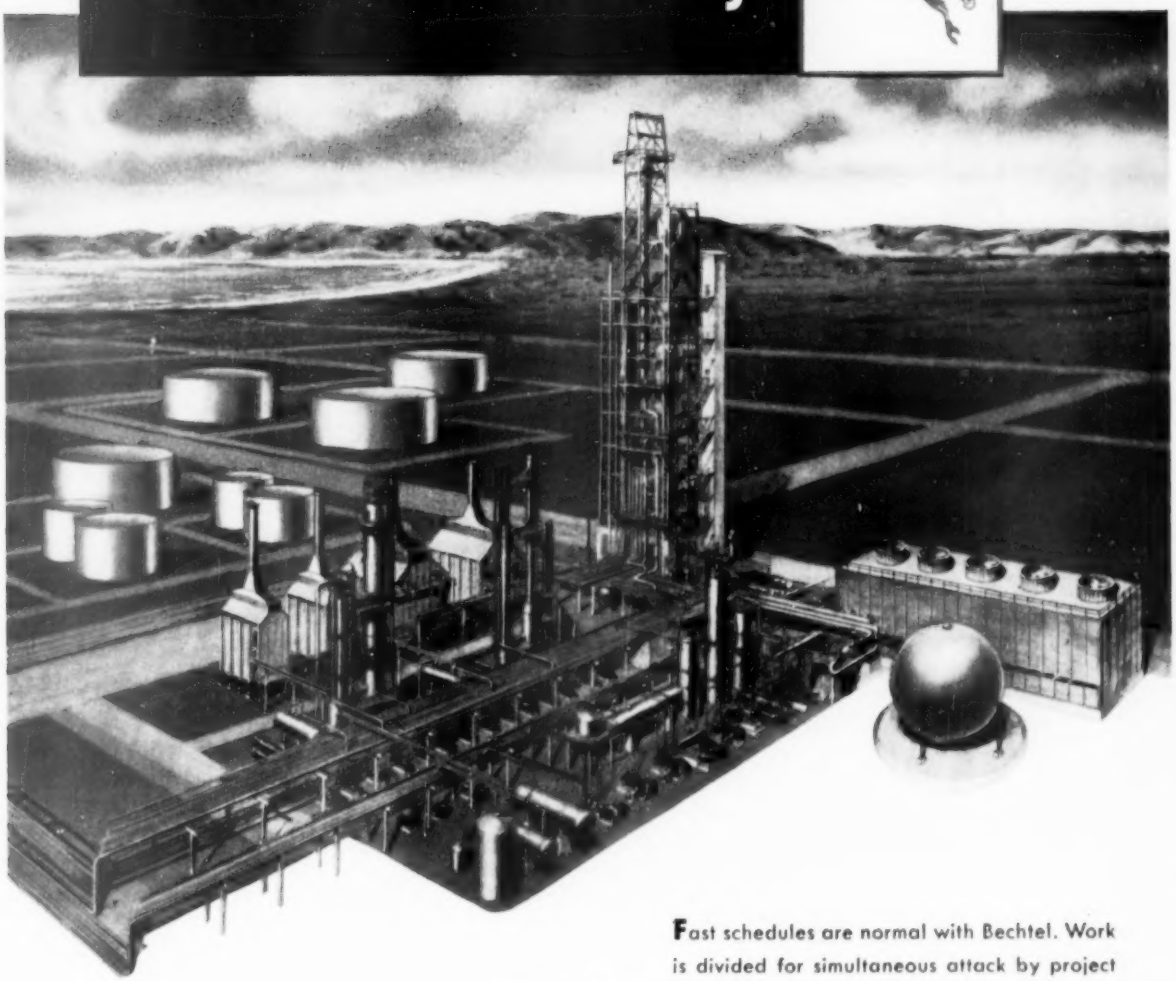


Here's what Chapman means by "Cushioning:"

This specially designed, "air-foil" disc balances perfectly in open position . . . then drops easily to closed position (cushioned by the flow). No jarring or slamming, in usual pipe-layouts. Write for bulletin.

CHAPMAN (TILTING DISC) **CHECK VALVES**

When Time Must Fly



● Another Flying Red Horse "first." A significant development in the field of refining pioneered by Socony-Vacuum Oil Co., Inc., this is only the second Thermofor catalytic reformer to be built. Like the first, for Socony-Vacuum in Kansas, it is a Bechtel job—design, procurement and construction—being built at Torrance for Socony-Vacuum's western affiliate, General Petroleum Corporation. Capacity: 19,000 barrels-per-day.

Fast schedules are normal with Bechtel. Work is divided for simultaneous attack by project teams, closely coordinated under senior executive direction. Each job draws upon the facilities of the entire organization for:

. . . counsel and technical specialties

. . . estimating and cost control

. . . procurement, expediting and inspection (with permanent personnel at many key locations)

. . . supervisory and skilled manpower

. . . recruitment and labor relations

Placing full responsibility with Bechtel is the ideal solution to problems of design, supply and construction.

BECHTEL

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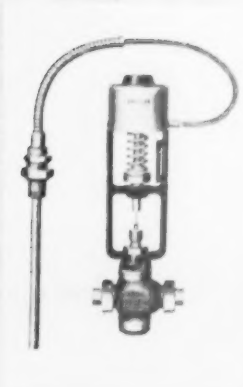
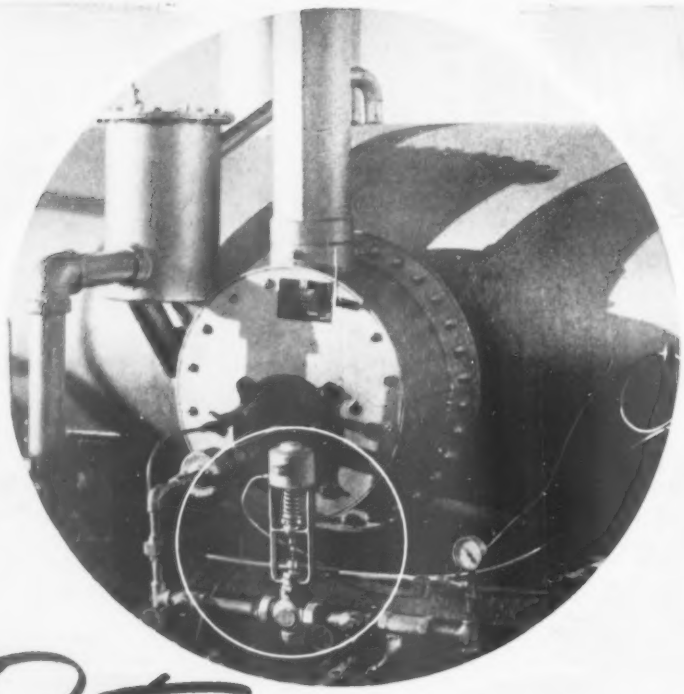
BUILDERS FOR INDUSTRY

Los Angeles • **SAN FRANCISCO** • *New York*





On Duty 'ROUND THE CLOCK . . .

AMERICAN TEMPERATURE REGULATORS

The temperature of this oil treater is *constantly* maintained within prescribed limits. Such safe, dependable service is assured by the self-operated, precision-built American Temperature Regulator. A turn of a conveniently placed adjustment nut sets the temperature. And, to duplicate any setting easily and quickly, a scale is mounted on the Regulator frame. Between the bellows and adjusting spring is a safety spring that protects the Regulator if the bulb is accidentally subjected to excessive temperature. Damage and disturbance of the set temperature are prevented by heavy armor that safeguards the capillary tubing and seamless bellows.

American Temperature Regulators give positive temperature control of oil, water, steam and other media — help maintain product quality and reduce costs. Sizes range from ¼" through 4". Two types of valve action available: *direct action* for use in *heating* processes; *reverse action* for application in *cooling* processes. Both types are ruggedly constructed, efficient and dependable. Bulletin 112 contains complete data, including selection tables. To be certain of safe, economical processing, let your nearby American Instruments Distributor help you choose the right American Temperature Regulator for your needs.

PERSONAL SERVICE is the policy of your Industrial Supply Distributor. He stocks Manning, Maxwell & Moore and other products in types and sizes you need to avoid delays and inventory costs.

AMERICAN INDUSTRIAL INSTRUMENTS

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CHEMICAL PROCESS NEWS

PUBLISHED BY CHEMICAL PROCESS DIVISION, THE M. W. KELLOGG COMPANY AUGUST 1953

NOTES ON

OXO PROCESS

Although the OXO process, because of its relatively recent appearance in the chemical industry, has frequently taken technical headlines, the various steps which precede this reaction are just as fundamental to the economic success of this new method for making alcohols.

* * *

Typical of OXO processing is a plant now underway in the U. S. in which a C_7 cut is reacted with synthesis gas to make aldehyde which is then hydrogenated to iso-octyl alcohol.

* * *

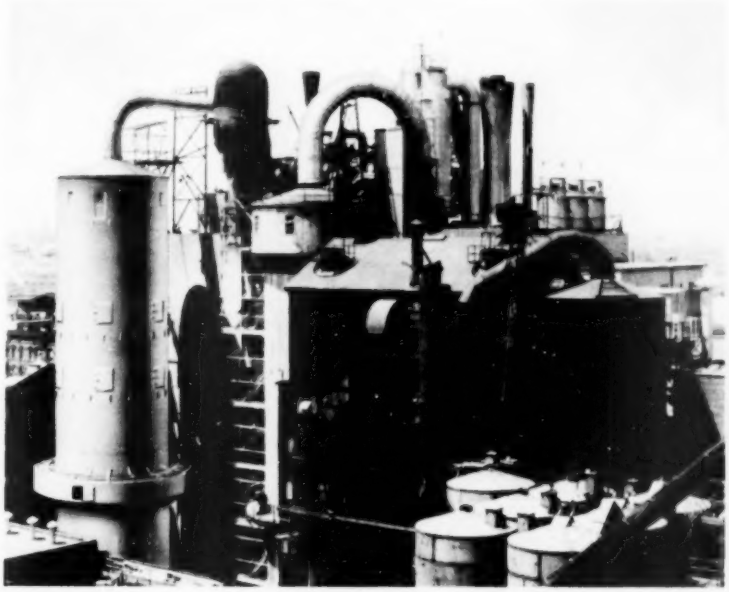
The three major feed preparation steps were all designed by Kellogg which is erecting the entire plant. These are (1) preparation of synthesis gas, (2) purification of hydrogen, and (3) close fractionation and high recovery of a C_7 heart cut from polymer gasoline.

* * *

In designing the synthesis gas reformer, particular attention was paid to flexibility in view of the novelty of the OXO process so that the composition of the gas might be varied to explore the effect of different mixtures on the yield of alcohol.

* * *

One of the novel features of the overall integration of the plant is a unique combination furnace for the production of hydrogen and synthesis gas. By providing the heating requirements for both these processes from one source, a saving in furnace cost of about 40% is effected.



Proper powder handling takes sneeze out of kitchen

One problem in the manufacture of detergents for home use lies in particle breakage. It causes sneezing in the kitchen as the housewife inadvertently inhales microscopic dust when she shakes out the "soap."

This domestic annoyance had major chemical engineering repercussions at the manufacturing level—and it brought into play a design concept usually associated with the oil refining industry.

The majority of particle breakage has occurred in the handling of huge volumes of powdered detergent following the drying step. When engineering this particular section of a new detergent plant—which is now in production—Kellogg utilized its specific experience acquired in designing scores of Fluid catalyst systems in the oil refining and chemical industries, and designed a new type of carrier system.

In essence, the unique system which involves large volumes of detergent particles cushioned on air, is a by-product of fluid processing. It gently and rapidly transports the dried detergent to the top of a six-story building for further processing with minimum production of "sneezing powder."

Montecatini Urea Process Saves on Utilities Costs

One of the major economic advantages of the Montecatini urea process lies in very significant utilities savings. These are brought about by maintaining the recycle of carbamate, ammonia and carbon dioxide in a liquid state rather than separating these components and then recompressing before charging them to the reactor.

Thus, in comparison with other urea processes on the market, it's a case of pumps vs. compressors—at a saving in utilities computed to be about 25%.

(SEE REVERSE SIDE)

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CHEMICAL PROCESS NEWS

CONTINUED FROM PRECEDING PAGE

Polyethylene Plant Now in Engineering

Engineering is well underway on a large polyethylene plant Kellogg is soon to erect in Tuscola, Ill., for the National Petrochemical Corporation.

When complete, at a cost of several million dollars it will produce 50 million pounds annually of this important basic material. The process is licensed by Imperial Chemical Industries, Ltd., of England.

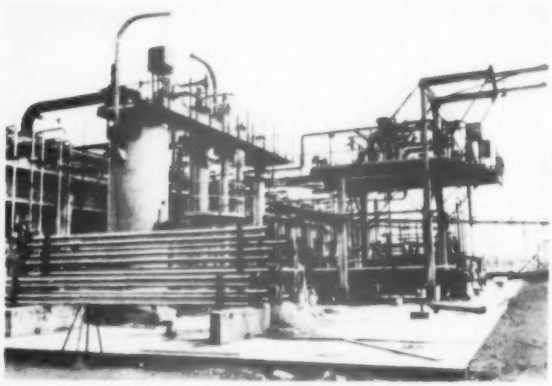
To a large extent, Kellogg's familiarity with the polyethylene process stemmed from another recent contract. This one involved the processing and erection of an ultra-high purity ethylene plant for ICI, the product from which is charged directly to a polyethylene plant.

In the work concerned with the design and construction of this plant (it produces 99.94% pure ethylene) Kellogg developed a close association with ICI which led to its present familiarity with the problems of manufacturing polyethylene.

High Pressure Ammonia Plant Nearly Ready

Insulating, weather-proofing and painting stage has been reached in the erection of this ammonia plant on the West Coast. It is well over 75% complete.

When on stream it will employ not only Kellogg's unique reactor for the synthesis step but also an unusual design in the reformer which avails itself of the high pressure of natural gas. Thus 25 to 35% in compressor cost is eliminated at no loss to the effectiveness of the reforming operation.



Solexol® Marine Oil Unit for Norway

Part of a two-phased program for the processing of fish oils, this Solexol unit (above) is well underway for De-No-Fa in Norway. It employs propane to effect fractionation and decolorization in a process perfected in the Kellogg laboratories. It fractionates the oils into varied high and low-iodine grades which nominally are used in the production of margarine.

However, when desired, the unit may also be used for the production of a clean feed stock for a fat splitter (right above) Kellogg is erecting simultaneously. Typical of two units MWK has designed and erected in the United States, the new plant has strategic importance for Norway in that it will double the production of domestic glycerine.

Typical Current Kellogg Chemical Plant Contracts

- ★ Phenol-from-cumene (2)
- ★ Iso-octyl-alcohol
- ★ Ethylene
- ★ Polyethylene
- ★ Ammonia
- ★ Phthalic Anhydride (2)
- ★ Glyceride Purification
- ★ Liquid Fuel and Chemicals Synthesis from Coal

For further information, technical data, etc., relating to chemical or petrochemical processing, write

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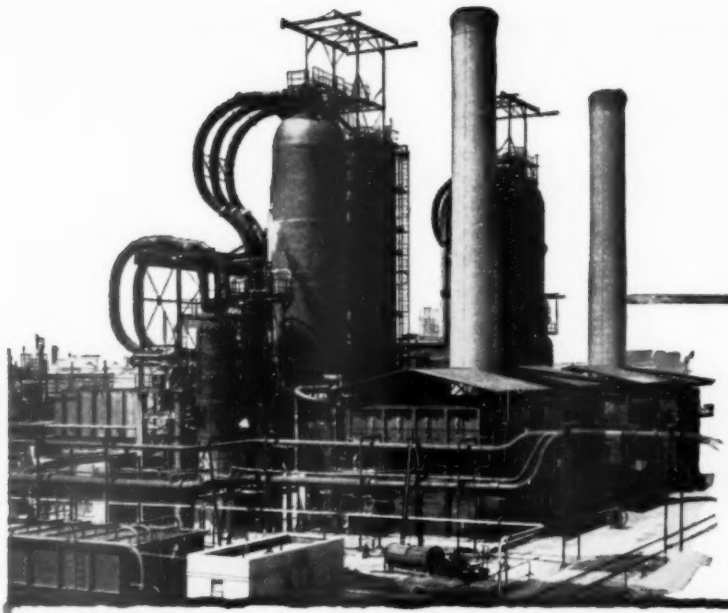


Carey INSULATION is at work for GULF...

keeping process and steam lines operating at lowest cost

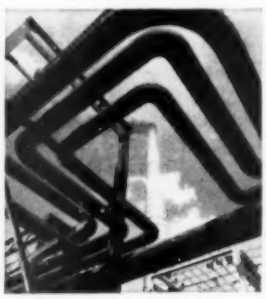
Refinery men demand *quality* insulation for processing operations. It's needed to keep fluids at constant temperatures. Helps cut fuel waste.

Since 1929, Carey insulation has been in continuous service at the Port Arthur, Texas plant of the Gulf Oil Corporation. Over the years, it has proven itself equal to the punishing strains of vibration and rapid expansion and contraction of equipment encountered in refinery operations . . . while guarding against heat loss, holding the line on costs!

In *your* plant, you'll find dozens of applications where a Carey insulation material can conserve heat, save fuel. Carey's complete line of high and low temperature insulations includes blocks, blankets, pipe wrapping and jackets, cements and new Super-Light 85% magnesia in precision-sized blocks and nesting "O.D." pipe coverings that are easy and economical to apply.

Whether your problem is one of insulating "straight runs" or complicated shapes, a Carey Industrial Sales Engineer can show you why Carey insulation is best for the job. He'll gladly furnish you with complete technical and application data. No obligation to you. Telephone, wire or write our nearest office today.

Another Carey product—Careystone Corrugated Asbestos-Cement Roofing and Siding—protects Gulf Oil Corporation's warehouse at Port Arthur, Texas. This material is absolutely impervious to corrosion, rust, rot, decay; never requires painting or preservative treatment; is virtually maintenance-free!



"Worm's eye" view of live and exhaust steam lines insulated with Carey materials. Besides the usual hazards of expansion, contraction and vibration, this Carey installation stands up under the extremely hot, humid weather of the Gulf area.

Carey insulation materials have weathered 24 years of continuous service on the fractionating tower and vapor lines of these atmospheric and vacuum stills at Gulf Oil Corporation's Port Arthur, Texas plant.

Write Today for Your FREE Copy

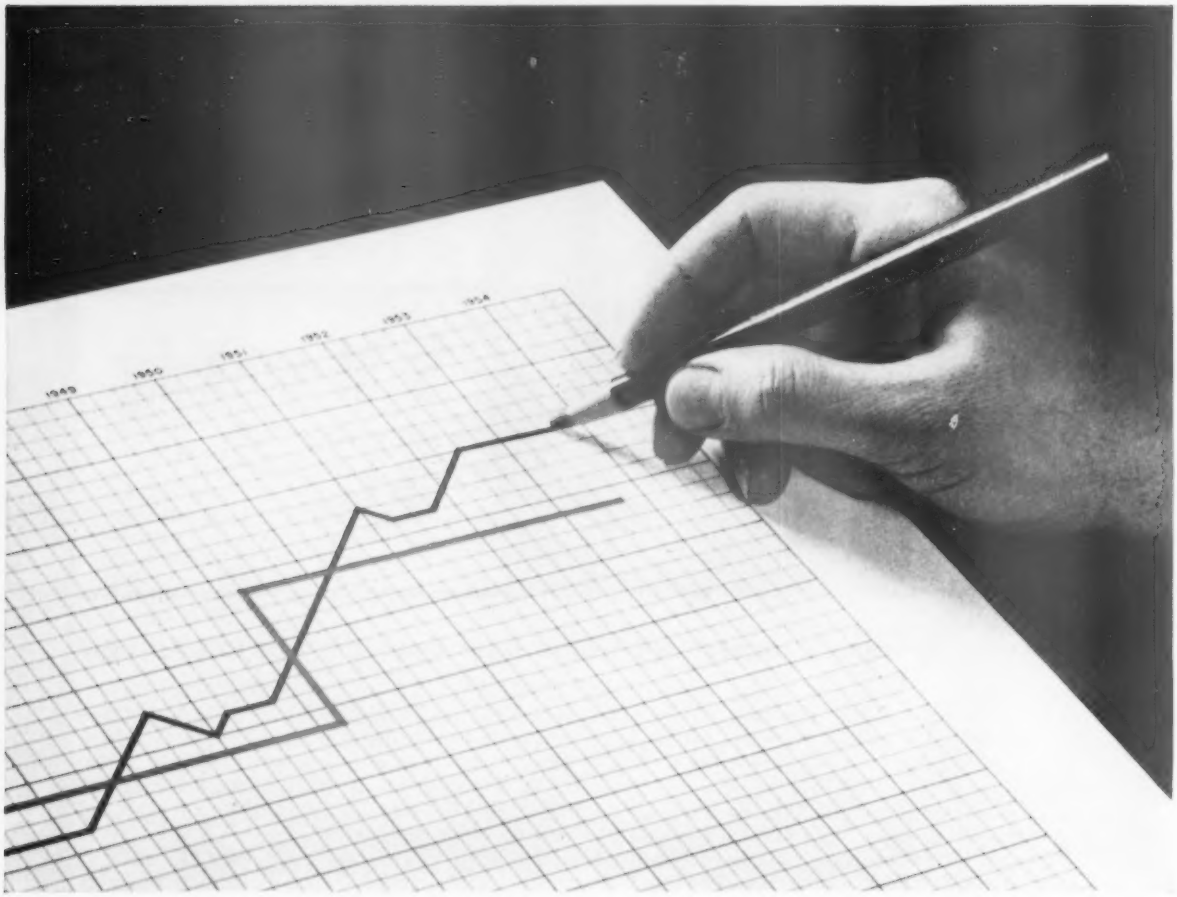
of "Industrial Insulation." Tells all about Carey insulations, and how to select and use them. A copy is yours for the asking. Write Dept. OGJ-8

FROM THE HOUSE OF CAREY—

Industrial Insulations • Careystone Corrugated Roofing and Siding • Built-up Roofing • Careyduct • Asphalt Plank • Asphalt Paints and Coatings • Industrial Flooring • Other Famous Products for Industry Since 1873

Carey

The Philip Carey Mfg. Company, Lockland, Cincinnati 15, Ohio • In Canada: The Philip Carey Co., Ltd., 277 Duke St., Montreal 3, P. Q.



Caution: dangerous curves

Keeping your fire protection properly balanced with changes in processes as well as ups and downs in production is vital to efficient, profitable operation.

You'll find your best answer to this serious fire problem which is currently confronting industry by installing an expansible, fully approved C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing System. Simple piping, running from one centrally located storage tank, instantly transports clean, non-damaging, non-conducting carbon dioxide anywhere in the plant area. Fire at any protected location is extinguished in seconds with an absolute minimum of expense and interruption.

Changes in your fire protection requirements are easily and economically provided for with a C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing System by initially installing an oversized storage tank and adding where necessary the supplementary discharge facilities at a later date.

Flexibility is the keynote . . . the low pressure carbon dioxide storage tanks range in capacity from one to fifty tons . . . discharge facilities can be either manual mechanical, manual electric, automatic mechanical, automatic electric or a combination of these . . . especially installed to fit your particular needs.

WHEN BUSINESS STOPS . . . INCOME STOPS!

Don't take chances with your investment. Secure the benefits of highly efficient fire protection engineering today... our extensive experience over the years is at your disposal without obligation. Get the facts now!

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MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers
Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

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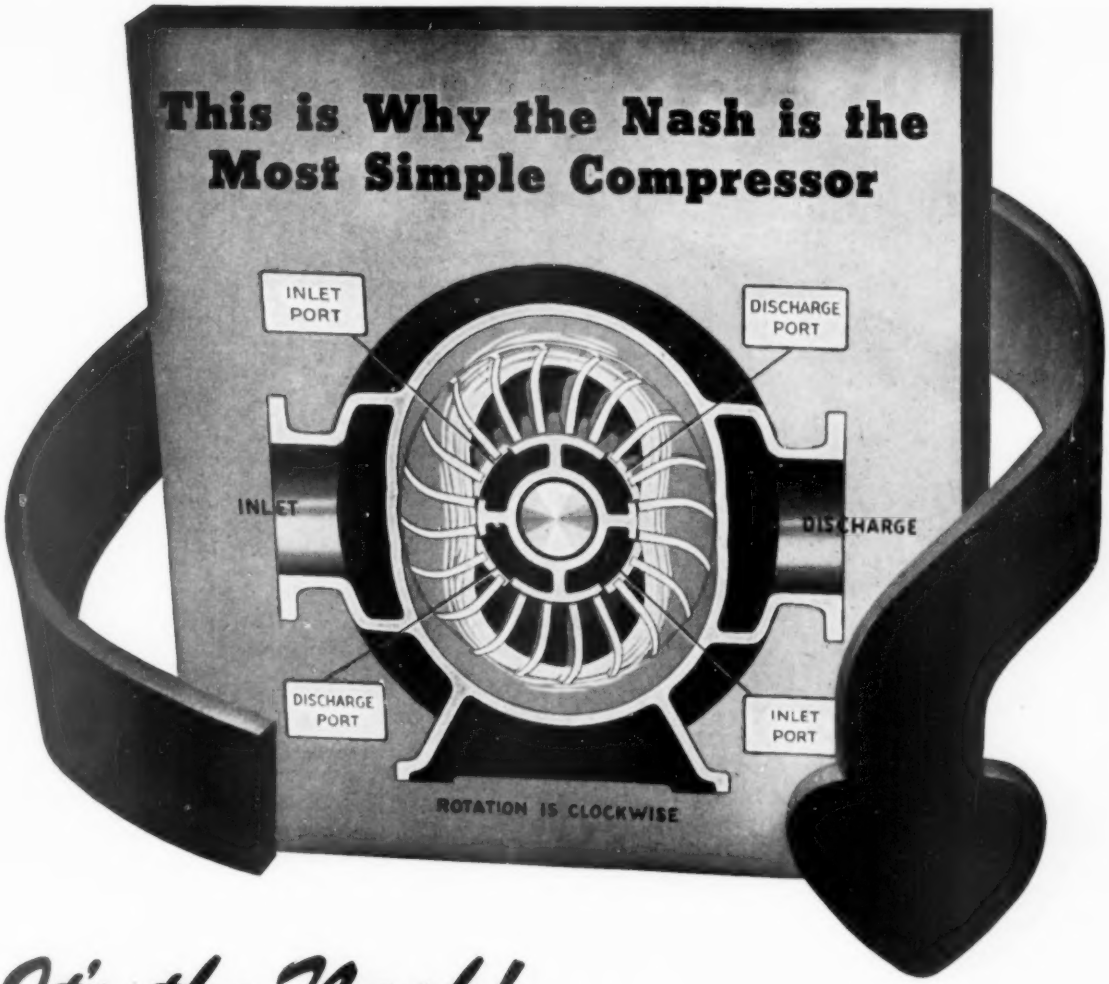
Robert W. Downs
Phone: 5-8721

This is Why the Nash is the Most Simple Compressor



It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY
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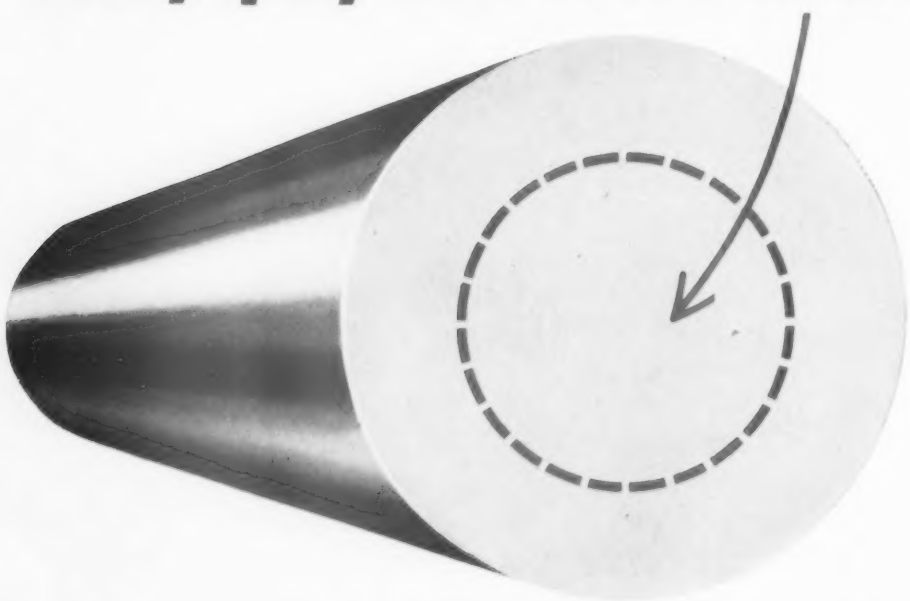
Why pay for this waste...



when you make hollow parts?

THE center hole's already in Timken® seamless tubing. There's far less metal to machine away, far less waste. You save machining time—get more parts per ton of steel.

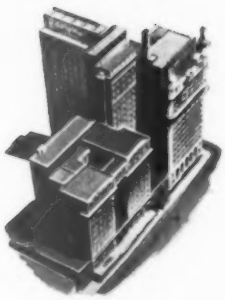
With Timken seamless steel tubing, finish boring is often the first production step. Screw machine stations can be released for other operations, giving you added machine capacity without additional machines.

To save you even *more* steel, the Timken Company's engineers will study your problem and recommend the most economical tube size for your hollow parts job—guaranteed to clean up to your dimensions.

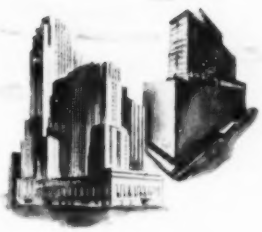
Timken seamless tubing gives you high internal quality because the piercing process by which it is made is basically a forging operation. It has a uniform spiral grain flow for greater strength and a refined grain structure which brings out the best in the quality of the metal. And the Timken Company's rigid quality control keeps this quality uniform from tube to tube and heat to heat. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



DALLAS
The Adolphus



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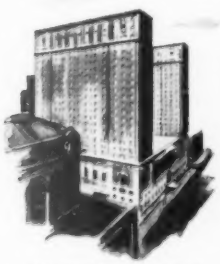

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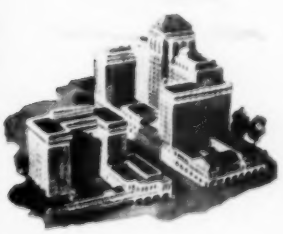

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this is the new, improved way that Wolverine can speed your installations of CONDENSER TUBES

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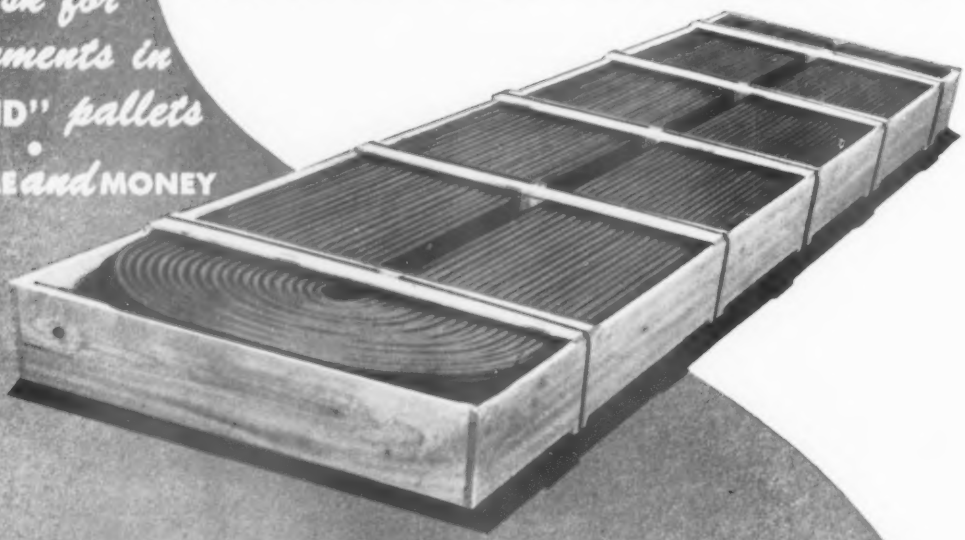
SAVE TIME *and* **MONEY**



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All SHELL AND TUBE ...HEAT EXCHANGERS by Vogt

ABOVE: View of new construction at Louisville Refining Company.

BELOW: Some of the many Shell and Tube Exchangers.

Engineered and Licensed by
UNIVERSAL OIL PRODUCTS CO.

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The new plant uses Vogt Shell and Tube Heat Exchangers exclusively and they make a significant contribution to the efficient and economic operations of this progressively modern refinery. Vogt Shell and Tube Heat Exchangers are available in many different types, with fixed or removable tube bundles, to meet the special problem and specific operating conditions of each installation. They are constructed from carbon and special steels to meet every temperature, pressure, or vacuum service requirement.

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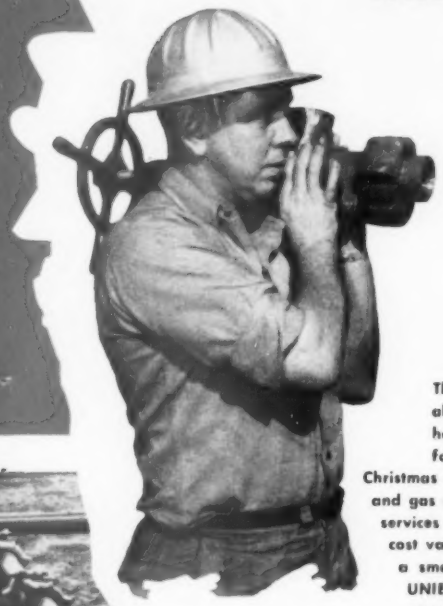
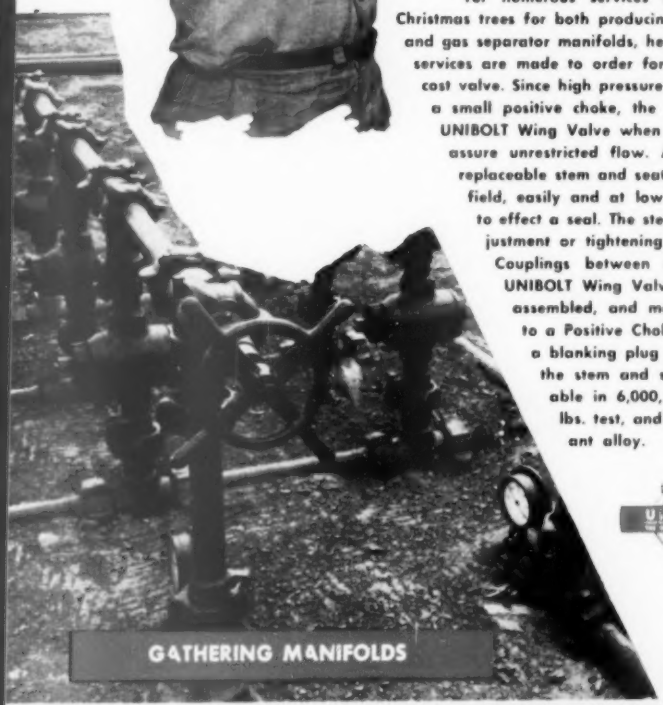
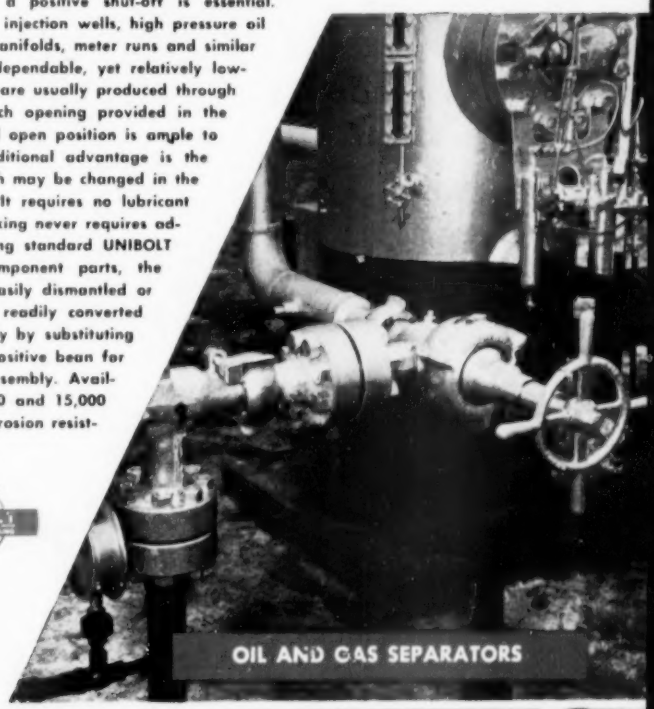


The UNIBOLT Wing Valve, designed originally for use as an adjustable choke where well conditions did not demand a positive choke, has become popular with production men as a dependable valve for numerous services where a positive shut-off is essential. Christmas trees for both producing and injection wells, high pressure oil and gas separator manifolds, heater manifolds, meter runs and similar services are made to order for this dependable, yet relatively low-cost valve. Since high pressure wells are usually produced through a small positive choke, the one-inch opening provided in the UNIBOLT Wing Valve when in full open position is ample to assure unrestricted flow. An additional advantage is the replaceable stem and seat, which may be changed in the field, easily and at low cost. It requires no lubricant to effect a seal. The stem packing never requires adjustment or tightening. Having standard UNIBOLT Couplings between its component parts, the UNIBOLT Wing Valve is easily dismantled or assembled, and may be readily converted to a Positive Choke Body by substituting a blanking plug and positive bean for the stem and seat assembly. Available in 6,000, 10,000 and 15,000 lbs. test, and in corrosion resistant alloy.



GATHERING MANIFOLDS



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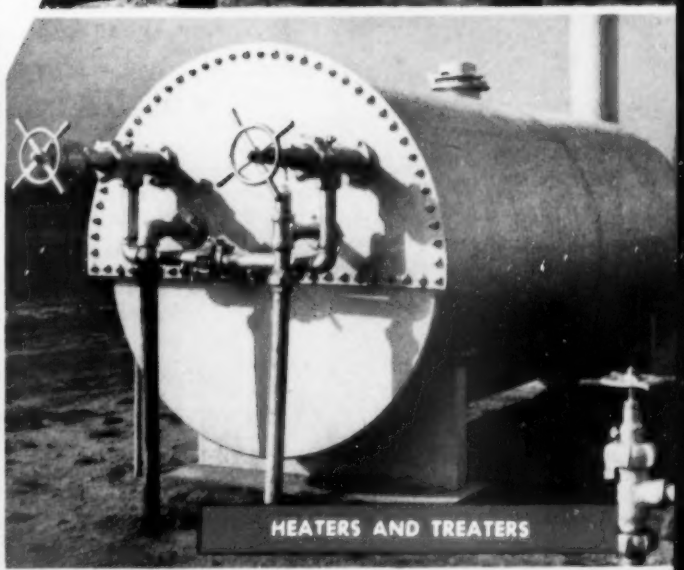
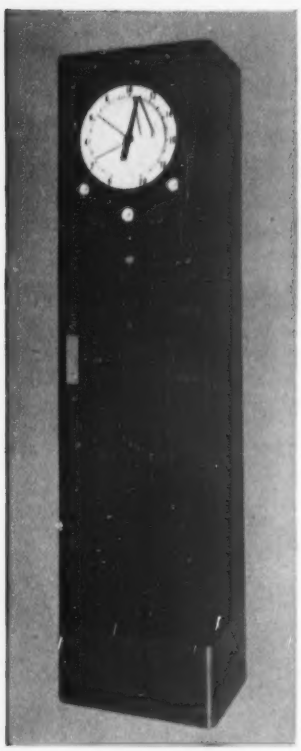


HEATERS AND TREATERS

THORNHILL-CRAVER COMPANY • P. O. BOX 1184 • HOUSTON, TEXAS

infra-red analysis *tells how much of a selected component exists in gas mixtures. Here, continuous analysis recorded by an* ***ElectroniK*** *potentiometer on a refinery's graphic panel is used for actual process control.*

mass spectrometry *separates materials on the basis of their different molecular weights . . . finds what constituents are present in what quantity. Above is a "package" mass spectrometer in which an* ***ElectroniK*** *instrument records test data.*



gas analyzer, *operating on the thermal conductivity principle, combines an* ***ElectroniK*** *recorder, analysis cell and accessories in a single panel assembly.*

New concepts *utilize*

These are some of the manufacturers who use *ElectroniK* instruments in their analyzers

Products of the companies checked are illustrated on these pages

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Baird Associates	North American Philips Co., Inc.
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robotized distillation apparatus *determines composition of hydrocarbon mixtures in minutes instead of hours. The temperature versus volume-distilled curve drawn by the* ***ElectroniK*** *potentiometer needs no replotting for computing analysis.*

# of process control

ElectroniK instruments

From the analytical laboratory comes a new concept of industrial process control, based directly on the desired chemical or physical characteristics of the product.

Continuous analyzers now make it possible to measure composition of gases and liquids accurately and automatically . . . to record this information . . . even to actuate automatic controls. Instead of temperature, pressure and flow, these new systems deal in terms of refractive index, density, ultraviolet and infrared spectra, radiation intensity and absorption.

An essential component of all these systems is automatic recording. To fill this critical function, leading manufacturers of automatic analyzers choose *ElectroniK* instruments. They choose them for their exceptional accuracy, that exploits fully the inherent precision of the new measuring techniques. They choose them, too, for sensitivity that records every essential change in readily readable detail. And they prefer *ElectroniK* recorders for their simple, rugged design that guarantees dependable service under any industrial conditions.

Your local Honeywell engineering representative will be glad to discuss the role of *ElectroniK* instruments in product-analysis systems . . . or in any conventional process control. Call him today . . . he is as near as your phone.

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● **REFERENCE DATA: Write for Bulletin 15-14, "Instruments Accelerate Research."**

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Anticipating the Demands of the Oil Industry...

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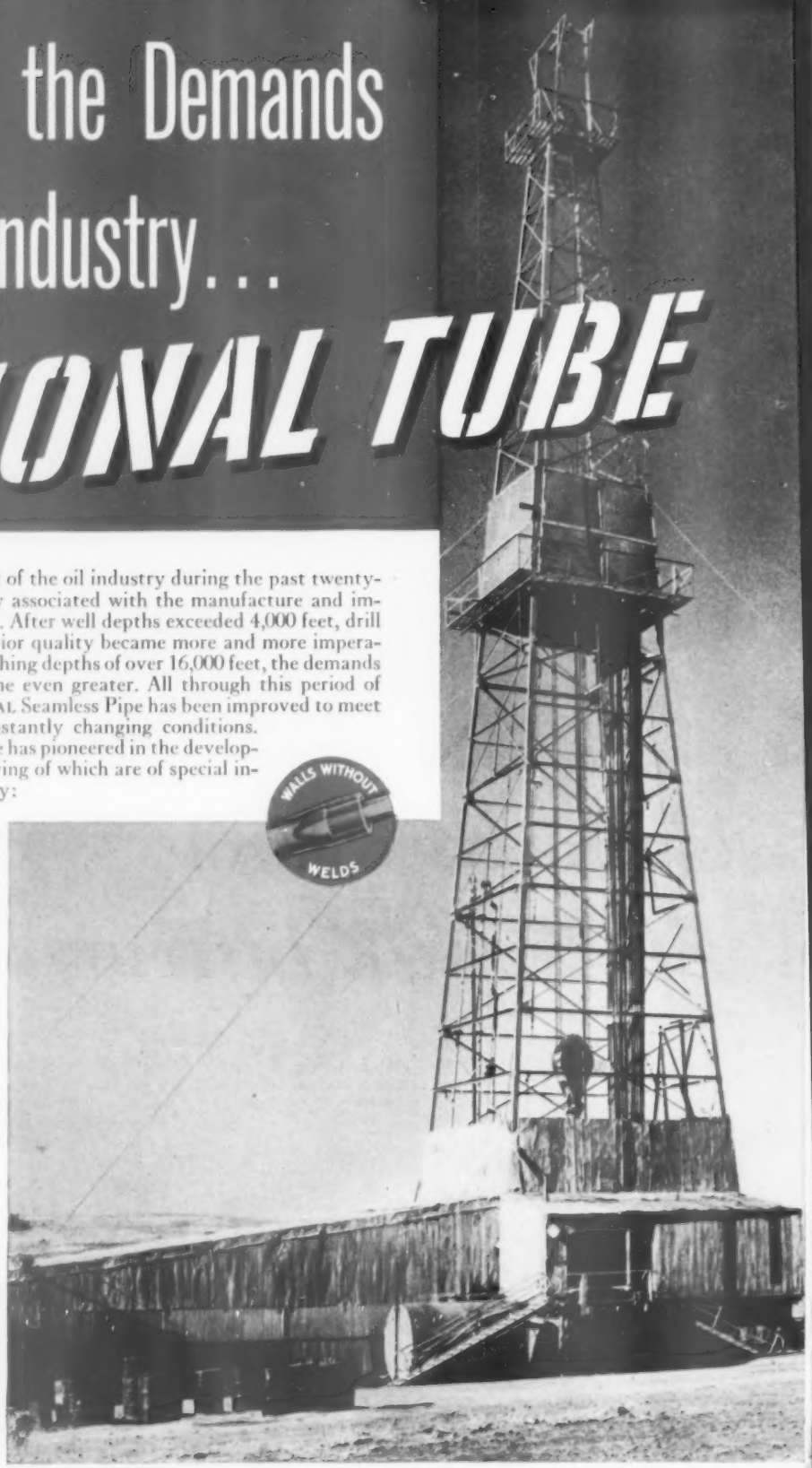
DEOXIDIZED BESSEMER STEEL CASING AND TUBING
especially well-suited for oil production because of its combination of high yield strength and good ductility.

WARM-WORKED CASING
An extremely high-strength casing possessing a uniformity of physical properties which gives it high collapse resistance and greatly increased joint strength.

NATIONAL DEEP-WELL CASING
a stronger casing than is provided under A.P.I. specifications, to meet constantly increasing depths. Because it is intended for severe service it is hydrostatically tested to 80% of minimum yield strength up to a maximum of 12,000 p.s.i.

NATIONAL BUTTRESS-THREAD CASING
developed to satisfy the need for a casing joint which will safely and economically support the weight of deep-well casing. The buttress-thread joint is comparable in strength to that of the body of the pipe.



NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
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U·S·S NATIONAL SEAMLESS PIPE AND TUBES

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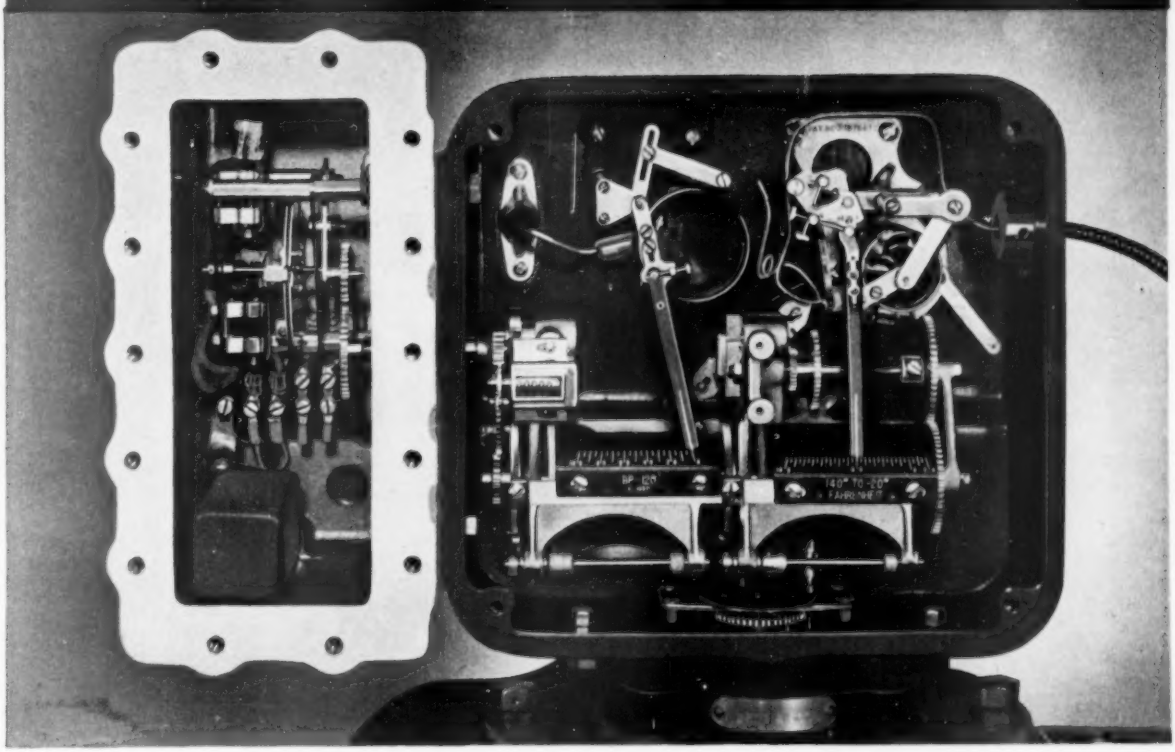
NEW AMERICAN® TELECOUNTERS

for base volume indexes



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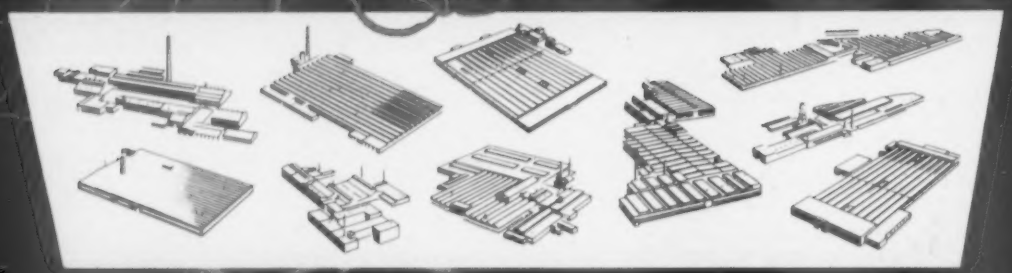
The *will* to serve is a Spicer tradition backed by nearly 50 years of outstanding achievement. It has been the impetus behind the wide range of Spicer accomplishments, that have done so much to make automotive vehicles so efficient.



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The Spicer *will* . . . plus Spicer skill and resources . . . form a strong *ability* team. Ten modern plants, geared to modern manufacturing tempo, are producing equipment that is the Standard of the Industry. We are prepared to design, develop, engineer and manufacture . . . with a high degree of excellence . . . your special needs in power transmission units.

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PETRECO

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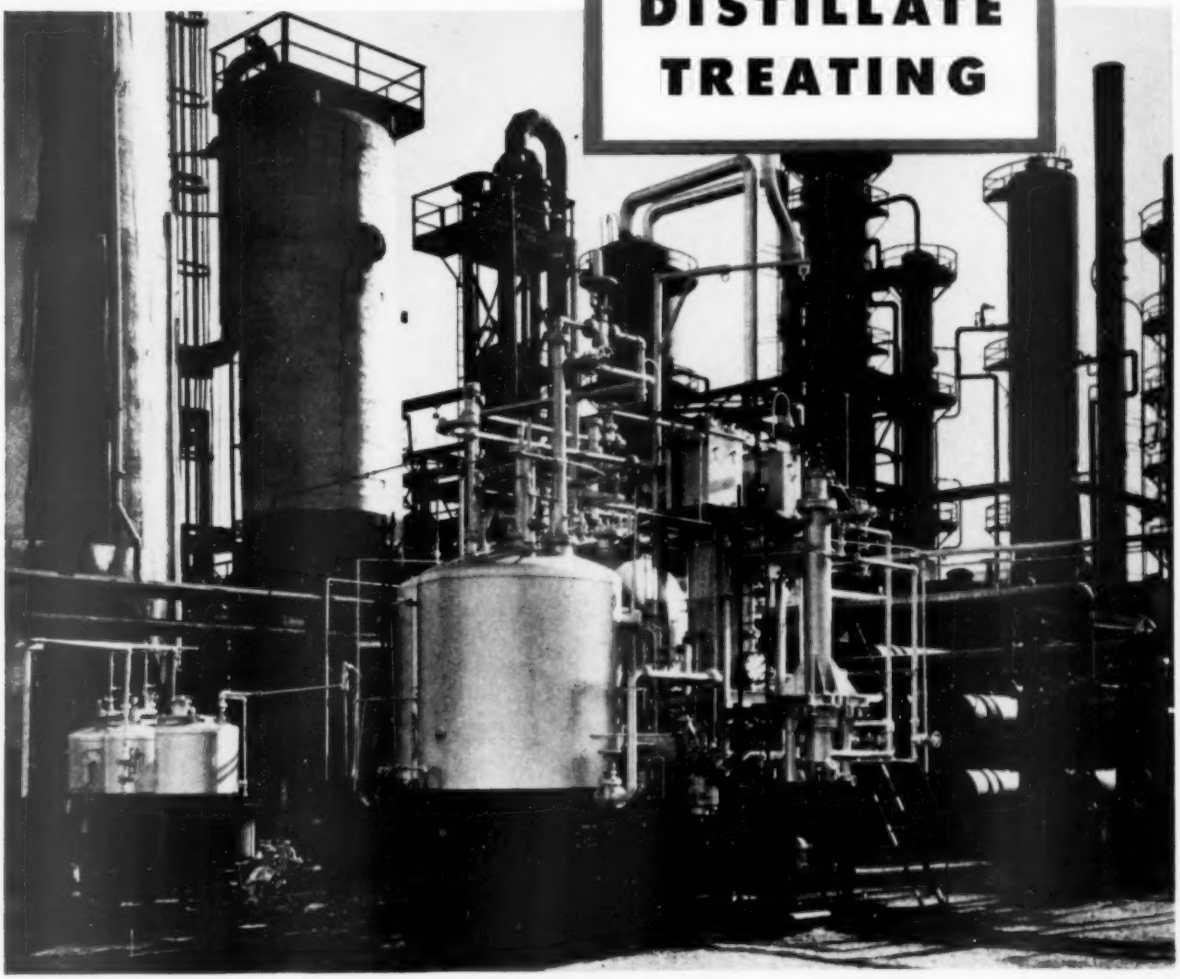

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CRUDE OILS: REMOVAL OF SALTS, SOLIDS, OTHER IMPURITIES; DEHYDRATING

DISTILLATES: ACID TREATING; CAUSTIC TREATING; DOCTOR TREATING

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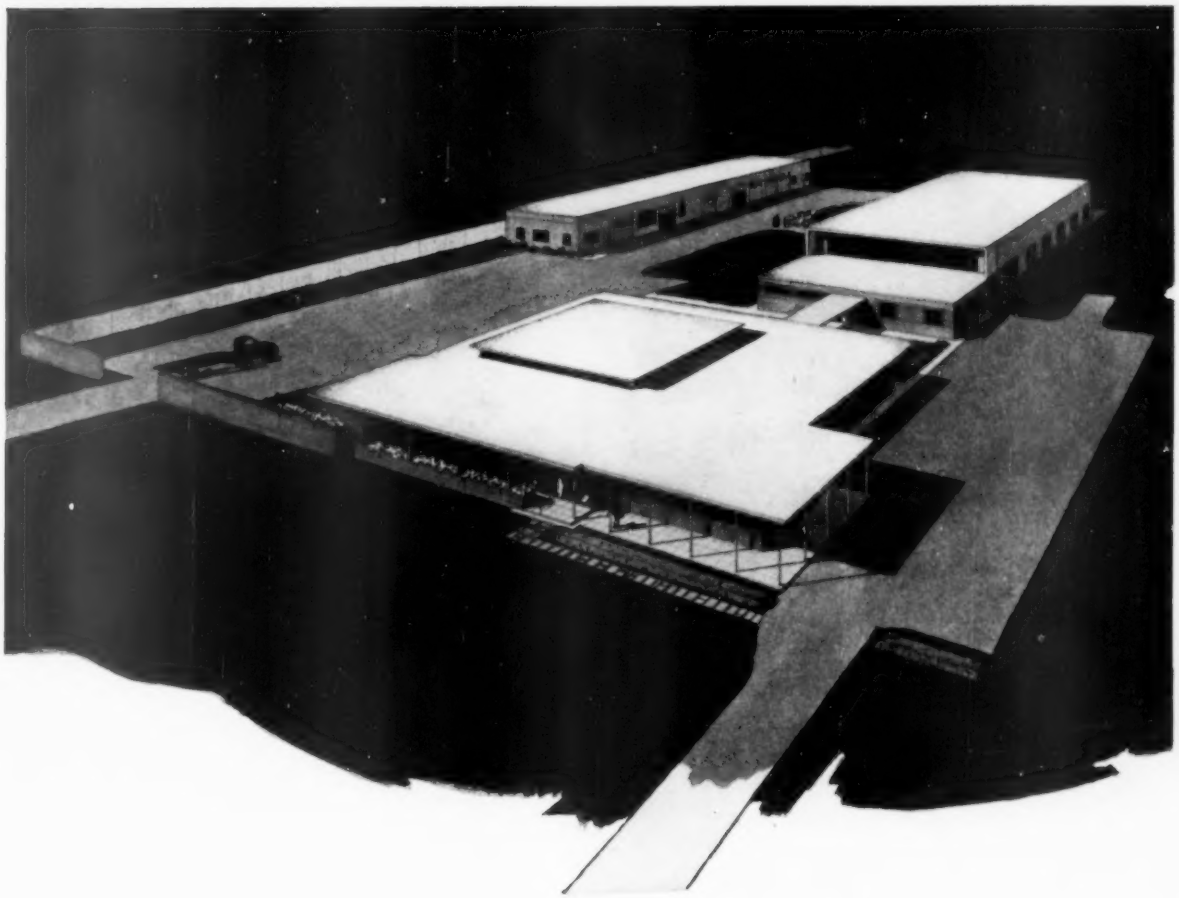

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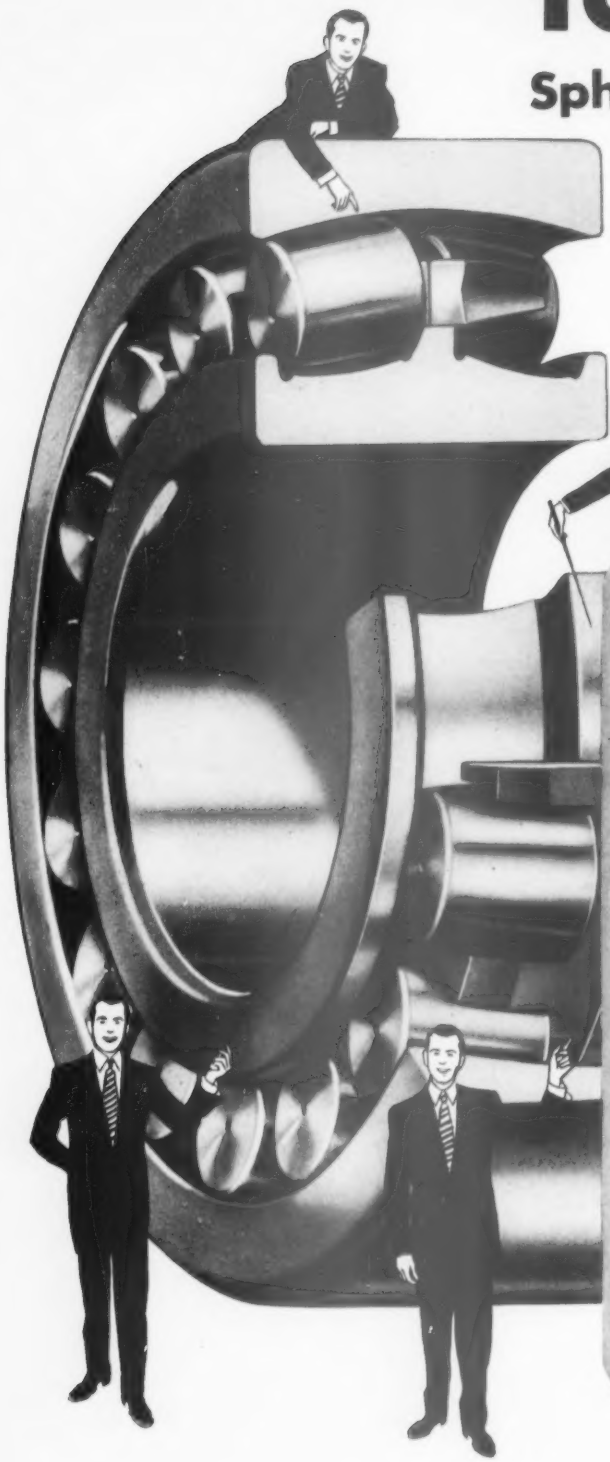
Spherical Roller Bearings

offer you these basic advantages!



- **Accurate geometrical conformity between races and rollers**—for maximum load bearing capacity at all times.
- **Inherent self-aligning feature**—for continuous service and free-rolling even under shock loads and at sustained speeds.
- **All contact surfaces precision ground from the finest of bearing quality steels**—for minimum friction and maximum life under the toughest operating conditions.
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- **Unit assembly, with sturdy flange and race construction**—for easy, economical handling during installation.
- **Available from stock with either straight or tapered bore**—for shaft or adapter mounting.

These advantages add up to maximum performance for your bearing dollar. That's why it always pays to specify TORRINGTON Spherical Roller Bearings.

THE TORRINGTON COMPANY
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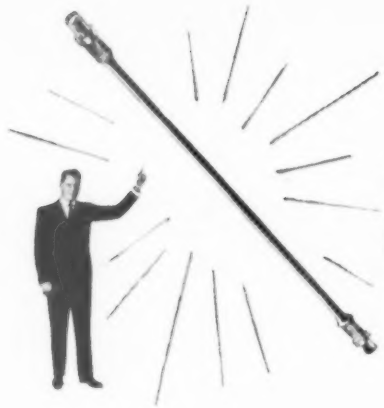
TORRINGTON SPHERICAL ROLLER **BEARINGS**

Spherical Roller • Tapered Roller • Cylindrical Roller • Needle • Ball • Needle Rollers



JONES

SUCKER

JONES has a way of adding strength and fatigue resistance to selected steels. In a special machine, the peening action of thousands of round balls impart a condition of compression to a scale-free surface—smooth it for painting in the distinctive green compound.

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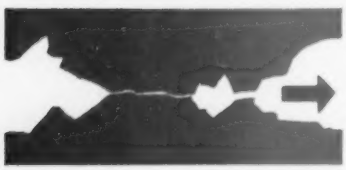
LOOK FOR THE GREEN RODS

THIS IS WHAT HAPPENS WHEN METAL RUBS METAL

No matter how finely a metal surface may be ground, under the microscope the metal is a series of tiny peaks and valleys. So, when one metal surface rubs against another one, friction is set up. Over a period of time, one of these things may happen . . .

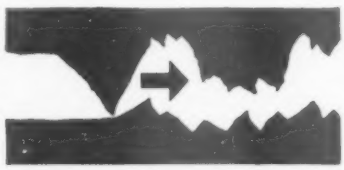


ADHESION

When friction, or load, comes to rest, weight flattens the tiny points of the metal surface and cold welding takes place.

SHEARING

In any dry metal-to-metal contact, shearing may take place when "hills" of one surface engage those of the other surface.



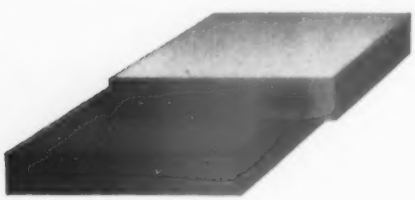
PLOWING

If one surface is harder than the other, plowing may take place as jagged "hills" tear into the softer metal surface.

One of these forms of damaging friction is likely to occur in any unlubricated mechanism; for instance, an unlubricated metal-to-metal valve. But . . .

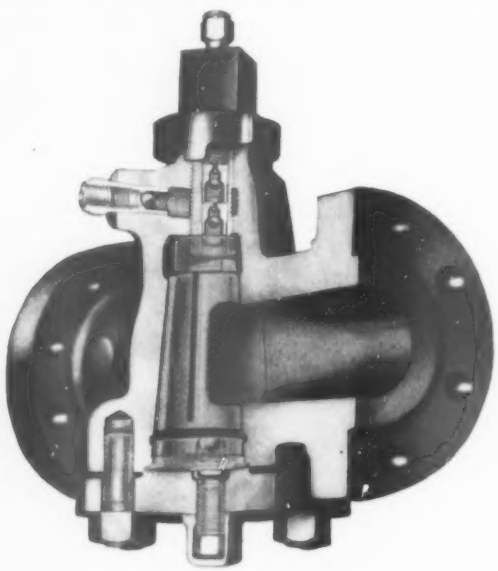
THIS IS WHAT HAPPENS IN NORDSTROM VALVES

In Nordstrom Valves, metal-to-metal contact is eliminated. Instead, a protective film of lubricant is spread over the contact area. The lubricant acts as a bearing surface, yet at the same time seals the valve ports against leakage.



SLIDING

The film of Rockwell lubricant separates the metal surfaces so that the plug slides easily. The only friction is from the motion within the fluid.



SEE HOW IT WORKS

Interconnected grooves in the plug of Nordstrom valves carry lubricant from the supply chamber in the shank of the plug. The same Rockwell lubricant which both seals and establishes a bearing surface also acts as a hydraulic jack to keep the plug in position to turn with minimum effort. Note, too, that in the Nordstrom valve there is no disk to wedge, only a plug to rotate. Rockwell Manufacturing Company, Pittsburgh 8, Pa.

ROCKWELL Built
Nordstrom Valves
Lubricant-Sealed for Positive Shut-Off

Another Rockwell Product

it's a faster, easier job with Claymont Welded Steel Pipe

Ease of bending and welding has won outstanding preference for Claymont Welded Steel Pipe on the longest and toughest pipe line jobs.

Every length of Claymont Pipe is made from high tensile steel plate produced in our own plant and carefully controlled through every phase of fabrication starting with the open hearth.

Claymont Pipe bends readily, field-welds fast and uniformly; fits accurately because end bevelling is precision-machined on the most modern end-facing equipment. Uniform size, straightness, roundness and ability to meet the most rigid specifications is assured through hydraulic expansion and exacting hydrostatic testing.

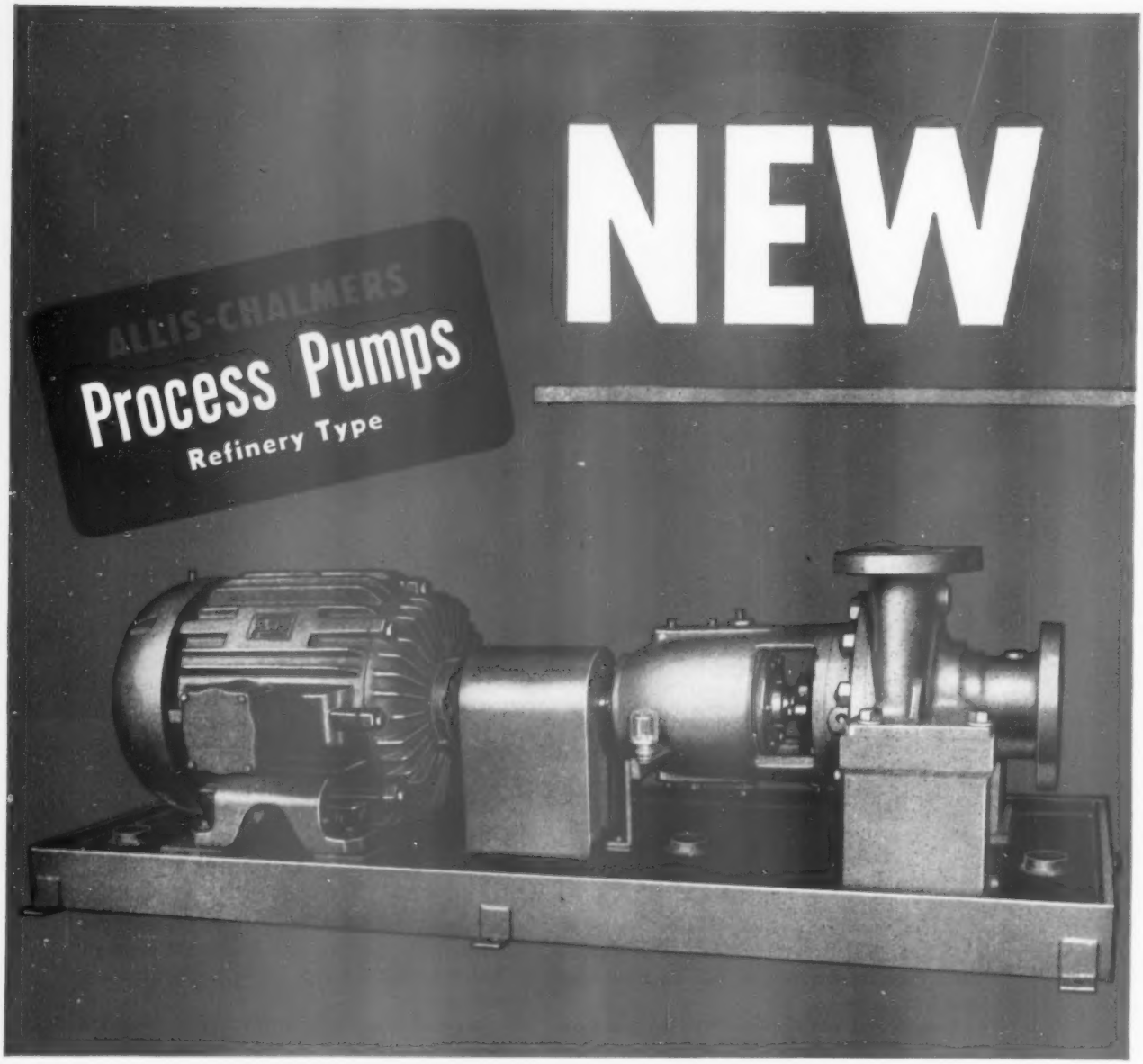
We can supply you with Claymont Welded Steel Pipe in lengths of 40 feet and in overall diameters from 22 inches through 36 inches. Special lengths and diameters can be provided if required. For complete information write or call Claymont Steel Products Department, Wickwire Spencer Steel Division, Claymont, Delaware.

Stainless-Clad Steel Plates . . . Flanged and Dished Heads . . . Carbon and Alloy Steel Plates

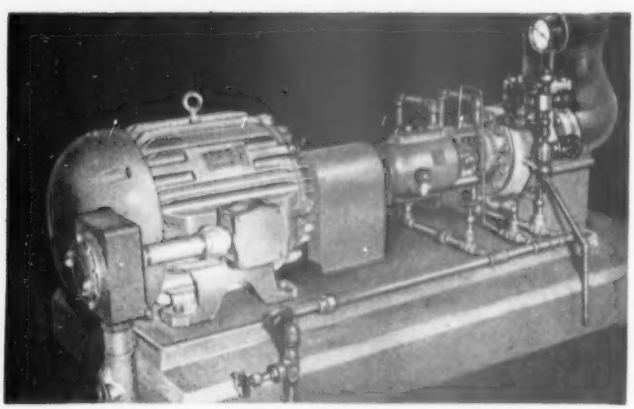
THE COLORADO FUEL AND IRON CORPORATION—Denver, Colorado
PACIFIC COAST DIVISION—Oakland, California
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit
New Orleans • New York • Philadelphia
CANADIAN OFFICES: Toronto • Winnipeg • Edmonton • Vancouver

CLAYMONT
WELDED STEEL PIPE
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION
CF&I

1619



Easy Installation and Maintenance



All Allis-Chalmers Type R pumps are furnished with spacer-type couplings. This type of coupling permits the pump to be disconnected from the driver and the entire rotating element — bearing bracket, shaft and impeller — removed without disturbing either the piping or the driver. This type of assembly permits quick examination of the pump, simplifies repairs or replacements and keeps down-time of the unit to a minimum.

In addition, two sets of bearing bracket assemblies fit the complete range of pump sizes. Since parts for only two sizes of bearing brackets are required, regardless of the number of pumps operated, parts inventories are greatly reduced. All bearing bracket parts of R-9 pumps are interchangeable and all R-12s are interchangeable. Where continuous operation is vital, a complete spare assembly can be kept on hand and replaced very quickly.

Refinery Pump

- ☆ **Specially designed for high temperature operation**
- ☆ **Choice of materials and stuffing box arrangements**
- ☆ **Ample provision for cooling**

HERE IS AN ENTIRELY NEW refinery-type pump. It has every feature designed for continuous trouble-free service and to keep your process pumping costs low.

Sealing Arrangement

When the standard stuffing box is used, it carries an adequate amount of packing plus a seal cage. A mechanical seal is interchangeable with the packing. No machining required. A seal plus auxiliary stuffing box may be installed by simply cutting off the end of the standard stuffing box.

Cooling Methods

The stuffing box is cooled by a water jacket of ample capacity. Further cooling of the packing is provided by in-and-out connections for the sealing oil, which is thus able to act as a coolant as well as a sealing medium. The stuffing box is provided with a water-flushed smothering gland. A second water jacket surrounds the front bearing and the lower part of the oil reservoir. For extremely high temperature operation, a water-cooled pedestal can be supplied.

Throat Bushing

A renewable throat bushing is tack-welded on the pump side of the stuffing box. The close clearance between the bushing and the shaft sleeve cuts infiltration into the stuffing box to a minimum. In case of seal or packing failure, the bushing remains in position and will not blow out.

Wearing Rings

The impeller and casing are both provided with front and rear wearing rings which make it easy and economical to maintain proper clearance. This design also reduces side thrust which in turn reduces shaft deflection and wear.

Double Volute

Double volute design is used in pumps of more than 400 gpm capacity. Forces set up in one volute are counteracted by equal and opposite forces in the other volute. Deflection forces are greatly reduced.

The impeller has low NPSH requirement so that it will successfully handle high volatile liquids at high temperatures.

Centerline Mounting

The pump is mounted at the centerline of the casing. Pipe strains are transmitted directly to the foundation. When proper precautions are taken, alignment of rotating parts will not be affected.

Complete Pumping Unit

Allis-Chalmers can supply a complete pumping unit — pump, motor and control — assembled and ready to install. Coordinated design and manufacture assure undivided responsibility. Call your nearby Allis-Chalmers District Office for help on your next pumping problem. Or write for Bulletin 52B7775. Allis-Chalmers, Milwaukee 1, Wis.

A-4031

ALLIS-CHALMERS

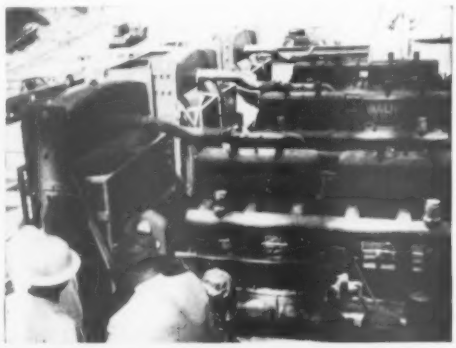
TO GET below 20,000 ft.

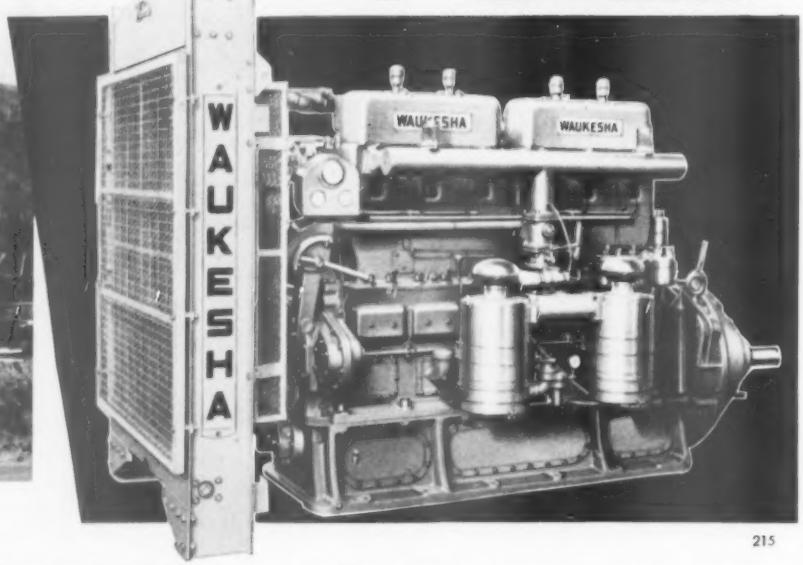
WILSON *Powers* BIGGEST RIG with Model 6-LRZU WAUKESHA

It's the biggest Wilson rig operating today! Built for San Joaquin Drilling Co., California . . . for the deepest drilling . . . down, down, below 20,000 ft. This new Wilson Super Titan Model Torcair rig has tremendous power, with its three Model 6-LRZU Waukeshas—the power plants of proved performance and deeper drilling dependability. Versatile for varying loads—they put out the plus power promptly, and smoothly as needed. For features: Bulletin 1481.

San Joaquin Drilling Company on location: Wilson Super Titan Model Torcair rig has three WAUKESHA 6-LRZU Big Gas power units (rig as designed can use five units).

WAUKESHA 6-LRZU Big Gas Power Unit 6-cyl., 9⅜-in. x 8½-in.; 3520 cu. in. displ.





215

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS. • NEW YORK • TULSA • LOS ANGELES

Stainless Steel cuts tray plate cleaning in depropanizing tower of this polyform unit

HERE'S an example of the way Stainless Steel's corrosion resistance can stretch out the intervals between cleaning when used in refinery equipment.

Stainless Steel is now being used in the perforated tray plates in the depropanizing tower of the polyform unit at Gulf Oil Corporation's Port Arthur, Tex., refinery. The material formerly used for this purpose reacted with corrosive agents in the gas and the $\frac{3}{32}$" or $\frac{7}{64}$" perforations in the tray were plugged up after two to three months' use.

Then Stainless Steel was given the job. It has greater resistance to corrosion and, consequently, the intervals between cleanings are substantially longer.

Corrosion resistance is only one of the characteristics of Stainless that make it so suitable for refinery use. It is strong, its surface is dense and durable and it performs well in elevated temperature service. When you put all these advantages together, you can see why it is the most effective weapon against refinery down time.

For finest performance from Stainless equipment, always be sure that your equipment fabricator uses perfected, service-tested U·S·S Stainless Steel.

Depropanizing tower in the polyform unit at Gulf Oil Corporation's Port Arthur, Tex., plant. Stainless Steel, used in the perforated trays, has helped to lengthen the intervals between cleanings.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
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UNITED STATES STEEL

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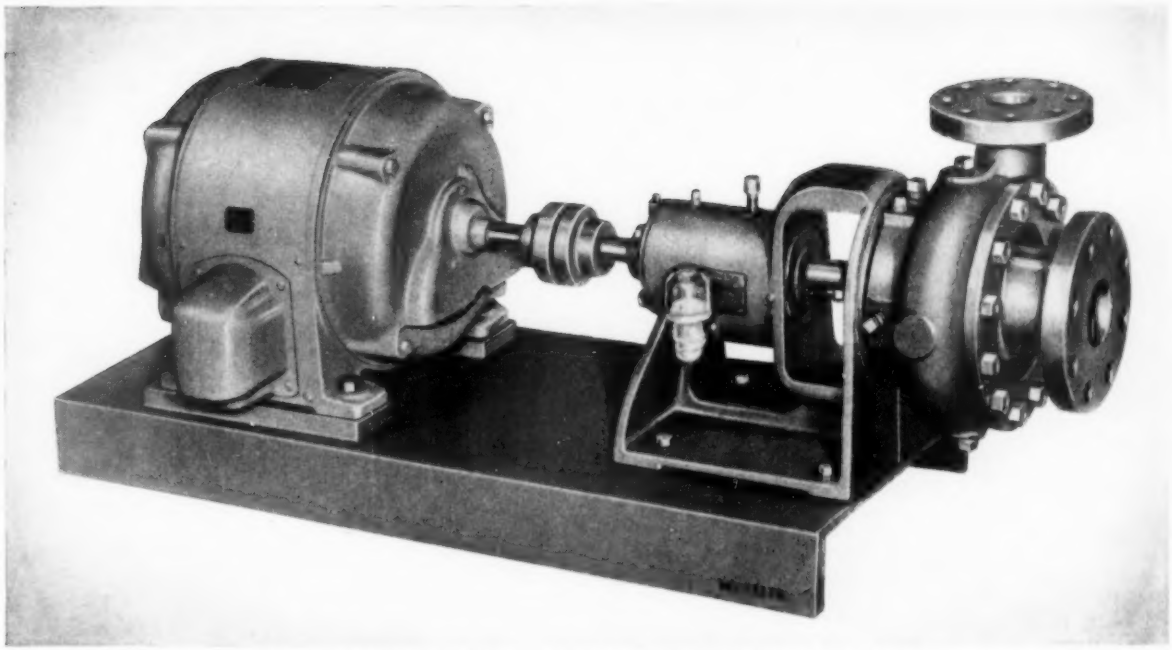
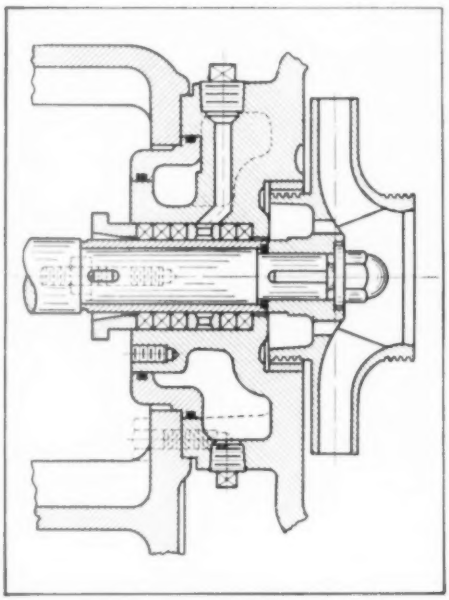
*according to a survey by the Safe Manufacturers' National Association

The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc. and its associated companies.



THE NEW WORTHINGTON TYPE CNR CENTRIFUGAL PUMP is designed to give dependable, trouble-free performance on a wide variety of refinery jobs.



WATER-COOLED STUFFING BOX provides longer life for packing and bearings. Cross-sectional view shows water-jacketing.

Here's another Worthington pump that makes refinery operations more efficient

It's our compact, single-stage Type CNR centrifugal pump, built to handle such refinery jobs as treating, blending, loading and transfer.

Here are some of the features of the modern CNR centrifugals:

1. HEAVY CASINGS in iron or steel for extra wear under high pressure and corrosive conditions.

2. WATER-COOLED STUFFING BOXES with conventional packing or mechanical seals optional.

3. HEAVY-DUTY CONSTRUCTION with 250-pound ASA flanges (150-pound in steel) for really rugged service.

4. INTERCHANGEABILITY. The CNR is part of our SESC pump line. That means complete interchangeability of any pump component for easier servicing, broader range of pump selection and greater availability.

You can get the new CNR's in capacities up to 2700 gpm, to handle temperatures up to 350° F.

Write for Bulletin W341-B16 to Worthington Corporation, Centrifugal Pump Division, Harrison, New Jersey. C-3-9

Types HR and HB. Twenty sizes. Capacities up to 1,800 gpm. Developed heads up to 900 ft. Proper selection of material permits use for temperatures far below zero to 800° F., for pressures from high vacuum to 750 psig.

Type HD. Hydraulically-balanced double-suction impeller handles boiling liquids with low submergence. Capacities range from 600 to 3,200 gpm at heads up to 700 ft. To 850 F and 550 psig.

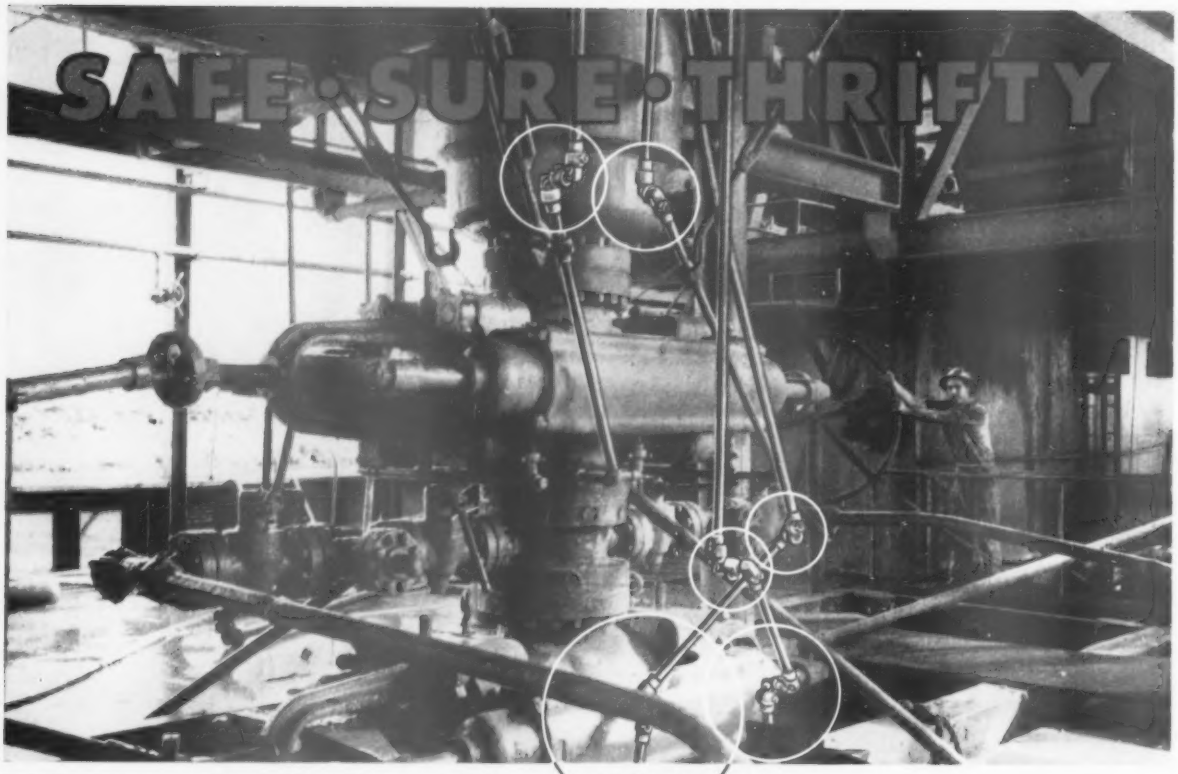
Type CNE. For loading or transfer service. Capacities to 2,700 gpm. Heads to 500 ft.

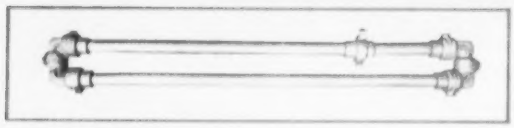
Type HM. Available in 12 sizes. Capacities to 700 gpm. Heads to 475 ft. Up to 500 F.

WORTHINGTON

Centrifugal Pumps

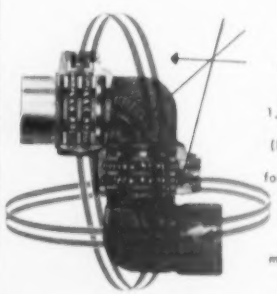
The World's Broadest Line Assures You the Right Pump for Every Job





CHIKSAN High Pressure Cementing and Circulating Hose incorporates CHIKSAN forged steel swivel joints with flame-hardened ball races and high pressure type packing units. Maximum working pressure is 6,000 psi; for extra high pressure, CHIKSAN joints to 15,000 psi with maximum temperature 225° F.

CHIKSAN All-Steel Rotary Hose comes in two types — the Heavy Duty Rotary Hose for standard rigs and the All-Steel Rotary Hose for Portable Rigs. Both types of CHIKSAN Rotary Hose provide uniform strength and maximum safety.



CHIKSAN Ball Bearing Swivel Joints are The SAFE — SURE — THRIFTY Tool of the Petroleum Industry — with full 360° rotation in 1, 2, and 3 planes. Over 1,000 different types, styles and sizes from 3/8" to 12" (larger sizes on special order) have been developed for pressures and services from 28" vacuum to 15,000 psi and for temperature ranges from minus 75° F. to a plus 500° F. Packing materials have been designed for each specific service.

CHIKSAN JOINTS MEET ALL SAFETY CODE REQUIREMENTS

It's SAFE — SURE — THRIFTY to use CHIKSAN High Pressure Ball Bearing Swivel Joints and Chiksan All-Steel Hose on blow-out preventer control lines, cementing and circulating lines and rotary hose.

An investment in CHIKSAN Ball Bearing Swivel Joints will reduce the hazard of ruptured lines from fire damage and from high pressure, while providing complete flexibility, long life, and low maintenance, with considerable saving in "rigging-up" time.

For a quarter of a century CHIKSAN Swivel Joints and All-Steel Hose have met the rugged requirements of the petroleum industry. CHIKSAN products have been improved throughout the years to keep pace with the industry's increasingly exacting demands.

The Flow of Petroleum Relies on

CHIKSAN

Ball-Bearing Swivel Joints

Sold by Leading Supply Stores Everywhere

Write for Catalog 52-3-D, Dept. OGJ-8

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Fit Over Safety
And Personal Glasses

NEW
Safety
Goggles

#326

#327

NEW – 4 WAYS!

1. New Cup Size and Shape
2. New Lens Size and Shape
3. New Side Shields
4. New Easy Lens Replacement

AO's newest development in eye protection—Chippers' and Welders' Coverglas Goggles—can be worn over practically every pair of personal glasses (even the biggest frames) and most types of safety prescription goggles *with and without side shield.*

Wider vision, too, because the lenses are larger and scientifically designed to give up to 20% more vision. Yet, with all these features the goggles weigh but a fraction of an ounce more than ordinary Coverglas goggles . . . cost only slightly more.

These goggles are the newest . . . and two of the greatest . . . developments since the advent of safety goggles. Get all the facts about these two outstanding Coverglas goggles from your AO Safety Products Representative. He can supply you.

QUICK FACTS

- Lens easily replaceable from rear (not front) by means of a spring clamp—no tools needed
- Lightweight, brown plastic cups fit face snugly, won't conduct heat or electricity
- Light-tight side shields for welders (on No. 327 goggle) provide indirect ventilation
- Bridge—High-grade leather. Instant adjustment
- AO worker-lab tests show much greater field of vision and increased comfort
- All-rubber headband, easily adjustable

"326" Chippers' Coverglas goggle supplied with regular Super Armorplate lenses. "327" Welders' Coverglas goggle supplied with regular Noviweld lenses and cover lenses.

AO's Industrial Vision Program Increases Production, Decreases Accidents. Write today for booklet "Improved Industrial Vision" to 1011 Vision Park, Southbridge, Mass.

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COMPANY
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LIMITORQUE VALVE CONTROLS

far outnumber all others on major pipelines throughout the world

Far and wide, Limitorque Controls are known for their proven dependable performance under all service and climatic conditions. They open and close all types of pipe line and refinery valves at the push of a button, quickly and safely. Valves may be in nearby or far-off locations with valve status clearly shown by indicating lights at the control point. Actuation may be by electricity, air or natural gas. Your valve manufacturer can supply Limitorque Controls.

Tell us your valve operating problems . . . our engineers will gladly aid you.

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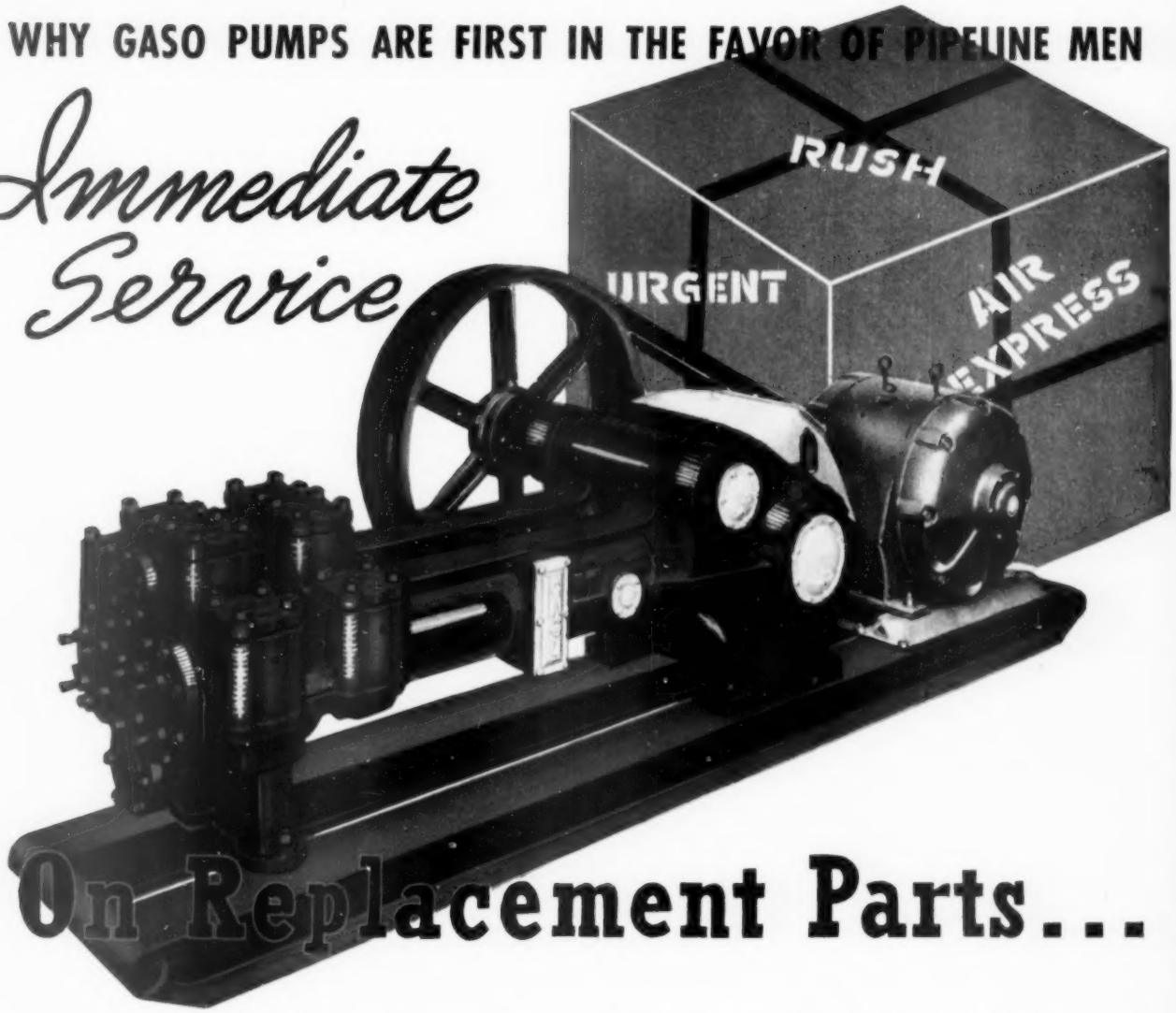
Industrial Gears and Speed Reducers
LimiTorque Valve Controls

WHY GASO PUMPS ARE FIRST IN THE FAVOR OF PIPELINE MEN

Immediate Service



On Replacement Parts...

Let's face it—even Gaso Pumps may sometimes need a replacement part, especially when they have been operating long after the retirement age of ordinary pumps. But when it happens, Gaso users don't worry. They know that Gaso maintains stocks of parts for all standard models regardless of age, with a policy of immediate shipment by fastest possible route. May we send you a copy of our latest catalog?

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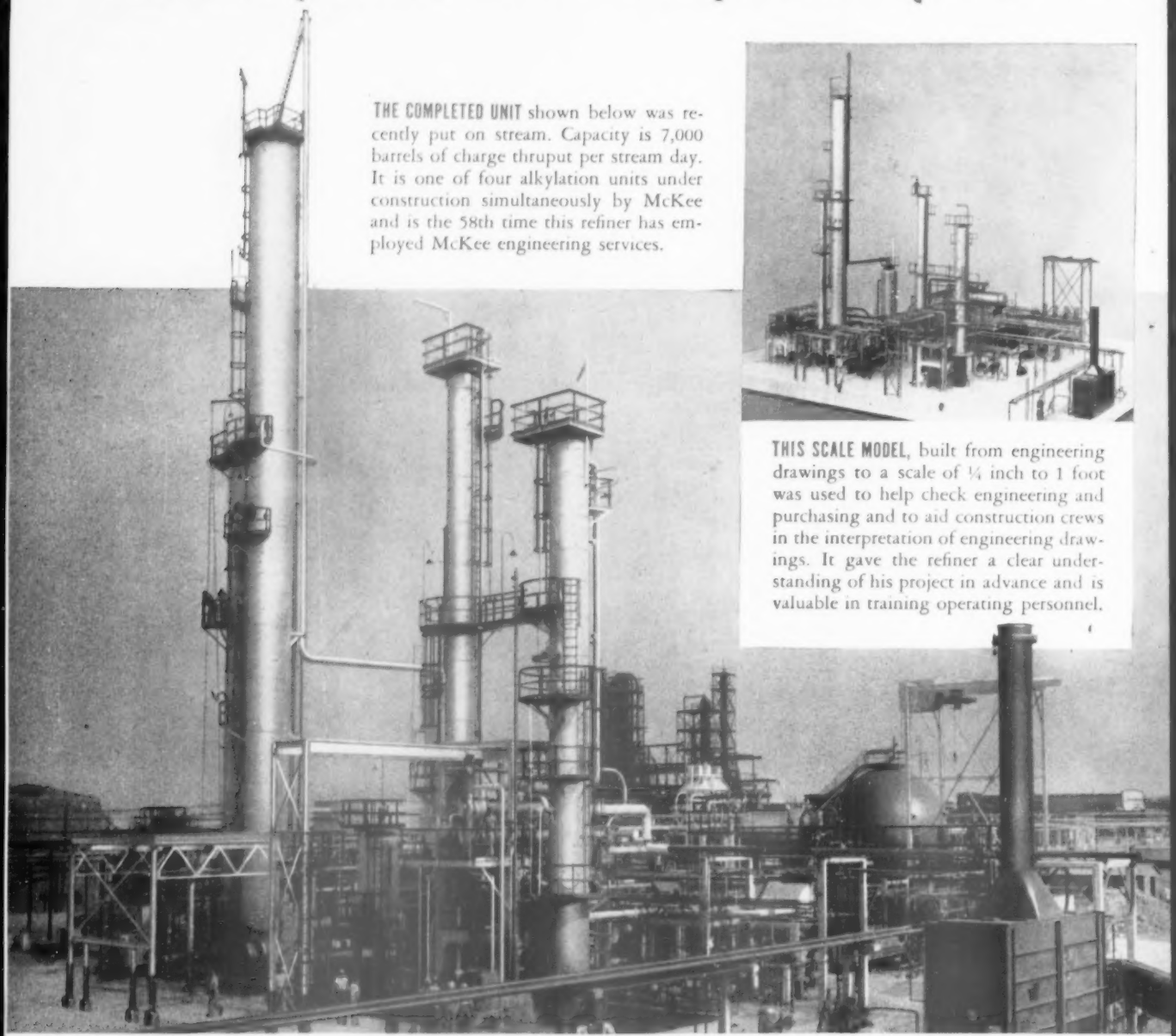
GASO PUMPS

for every oil industry need

New Alkylation Unit Completed by McKee

THE COMPLETED UNIT shown below was recently put on stream. Capacity is 7,000 barrels of charge thruput per stream day. It is one of four alkylation units under construction simultaneously by McKee and is the 58th time this refiner has employed McKee engineering services.

THIS SCALE MODEL, built from engineering drawings to a scale of ¼ inch to 1 foot was used to help check engineering and purchasing and to aid construction crews in the interpretation of engineering drawings. It gave the refiner a clear understanding of his project in advance and is valuable in training operating personnel.



MCKEE ENGINEERING leaves no stone unturned, no method unexplored in our constant effort to design and construct the most efficient plant in the shortest possible time and at lowest possible cost.

The use of scale models is only one example of how this organization utilizes every device available to make sure "*McKee Engineering means Assured Results.*" That's why refiners all over the world use McKee services again and again.

ENGINEERING, PURCHASING AND CONSTRUCTION FOR THE PETROLEUM REFINING AND IRON AND STEEL INDUSTRIES

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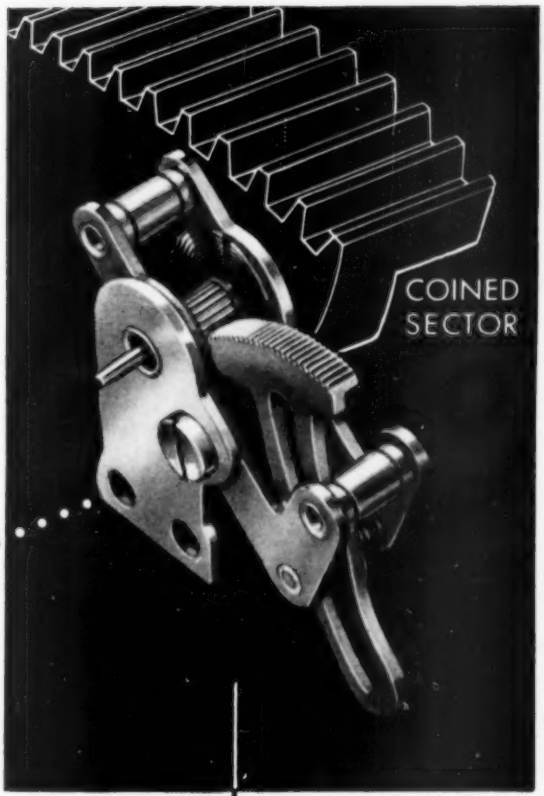
...for the world's finest gauge:

. . . the world's finest movement



To actually become the standard of comparison in its field, a product must be better; not just in some ways, but in *all* ways.

A particularly good example of such a product is the Marsh Master-gauge. By giving industry a gauge that is better in *all* ways, it has become the recognized standard of comparison in the pressure gauge field.

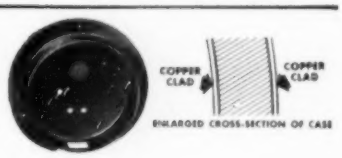
The movement illustrated here represents just one way—but a very important way—in which the Mastergauge excels. In a pressure gauge, the movement has the vital assignment of converting the action of the bourdon tube into accurate pressure indication. To do this unfailingly, a movement must be ruggedly constructed, practically frictionless and highly resistant to corrosion.

All of these attributes are ideally combined in the Master gauge movement. A self-lubricating, frictionless effect is achieved by using alternate stainless steel and monel throughout . . . gears, hardened stainless; bushings, "K" monel, and so on through all moving parts. A particularly outstanding feature contributing lasting accuracy is the "coined" sector gear. Note the broad face which results from this coined extrusion of the gear blank.

Yes, features like these, along with precision machining, painstaking assembly, and thoroughgoing testing, makes a better-in-all-ways movement for a better-in-all-ways gauge. Ask for up-to-the-minute information.

A better tube construction...

"Connoweld" A truly revolutionary development is the joining of the socket, bourdon tube, and end-piece into a one-piece unit in the Marsh Mastergauge. The photo of a socket cut in half shows the perfect fusion at the point where too many gauges leak. A special Marsh process — the Connoweld Process — makes this possible.



ENLARGED CROSS-SECTION OF CASE

A better Case . . .

"Marshalloy" Another recent development that has increased Mastergauge leadership is the copper-clad, wrought steel case. Copper surfaced by the Marsh-developed "Marshalloy" process, the case is attractive and non-corrosive. It is four times as strong and one-third lighter than conventional cast iron case!

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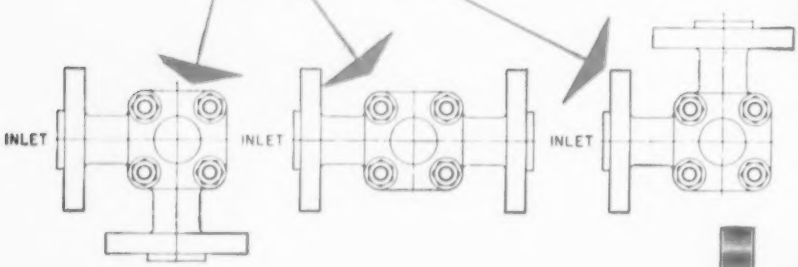
WITH Z BODY

CAN BE EASILY CONVERTED TO OFFSET ANGLE BODY



TYPE 567Z
with REVERSE ACTING TOPWORKS

- Split flange construction with seat ring retained in center without threads.
- Inner Valve—Micro-Flute, Micro-Form or throttle plug type inner valve with solid stem connections.
- Sizes ½", ¾", 1", 1½" and 2".
- Materials: Regularly furnished in carbon steel or 18-8 stainless. Also available in bronze, Hastelloy and monel; other alloys on request.
- Standard ISA face to face dimensions—flanged only.
- Available with a direct or reverse acting diaphragm motor.

FISHER LEADS THE INDUSTRY IN RESEARCH FOR BETTER PRESSURE CONTROL

FISHER GOVERNOR COMPANY • Marshalltown, Iowa

FISHER Since 1880

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Apply Directly Over Sound Rusted Surfaces

Just scrape and wirebrush to remove rust scale and loose particles — then brush Rust-Oleum 769 Damp-Proof Red Primer *directly over sound rusted surface.*

Lasts Longer Applied Directly Over Rust

Sandblasting, chemical pre-cleaning and other costly preparation methods are *not* usually required. Rust-Oleum penetrates the rust to bare metal, incorporating the rust particles into the coating.

Many Colors, Including Aluminum, and White

Rust-Oleum finish coatings incorporate the same basic rust-inhibiting vehicle as Rust-Oleum 769 Damp-Proof Red Primer. They provide *double protection* and enable you to beautify as you protect.

Practical Answer to Your Rust-Producing Conditions

Rust-Oleum resists rain, snow, heat, fumes, sun, salt water, and chemicals. So easy to use by brush, dip, or spray that one man often does the work of *two.*

Proved Throughout Industry for Over 25 Years

Indoors and out, Rust-Oleum has *proved* its capacity to stop rust! Rust-Oleum can do the same for your tanks, metal sash, stacks, girders, roofs, buildings, machinery, pipes, etc.

An Exclusive Formula

Rust-Oleum is *distinctive* as your fingerprint. It incorporates a specially-processed fish oil vehicle that *dries,* is odor-free, and is formulated in *many colors.* Specify Rust-Oleum — accept no substitutes.

There Is Only One Rust-Oleum

RUST-OLEUM STOPS RUST!

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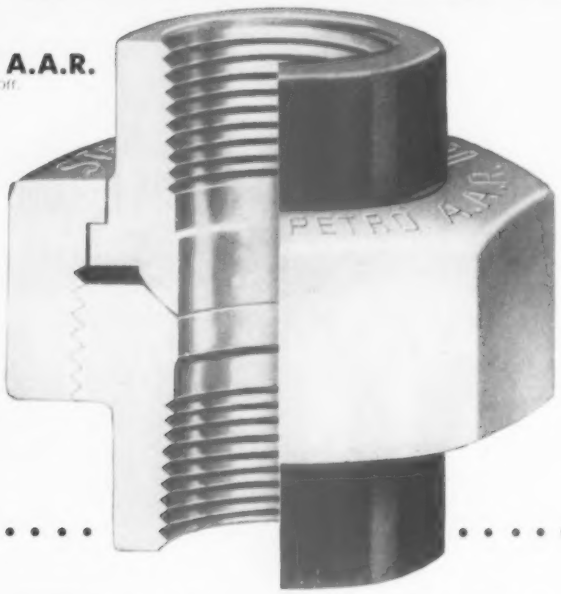
this will STIMULATE you

PETRO A.A.R.
Reg. U.S. Pat. Off.



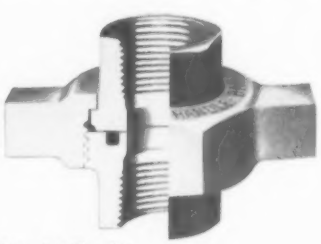
"PETRO A.A.R." Hot Forged of A.I.S.I. 1023 Open Hearth "Killed" Steel—For temperatures from 100° below zero F. to 1000° above zero F. A differential of 40 points (brinell) in hardness is maintained between the male and female seats to prevent seizure of seats at high temperatures.

Nut threads are permanently lubricated with Udylite Cadmium (plated). "PETRO A.A.R." screwed and "PETRO A.A.R." Socketweld are recommended for severe service on ammonia, air, gas, oil, steam, and water, and for general industrial and oil refinery maintenance.

HANDLE-BAR "O" RING
Reg. U.S. Pat. Off.

Forged Steel

HANDLE-BAR "O" RING unions do not depend on compression or force, as the terms relate to common gasket type unions. A positive pressure seal is effected with a synthetic oil-resistant "O" Ring set in a groove between the two mating surfaces. Hand tightening of the nut will hold the rated working pressure. The "O" Ring will not drop out when union is disconnected. However, the "O" Ring is replaceable, and at a very low cost. Our standard compound No. A-70 "O" Ring is recommended for cementing, mud, crude oil, lube oil, Natural Gas, and water services, and will work satisfactorily on acidizing, fuel oils, kerosene, and gasoline. Special "O" Rings are available for all services and temperatures up to 500° Fahrenheit.



Sizes ½" Thru 3"

500-3000 C.W.P.
Max. Temperature 212° F.

For additional information about these and other Forged Steel Unions write Department O. for Illustrated Catalog or refer to listings in Composite Catalog pages 3194-3195, Refinery Catalog page 695 and Chemical Engineering Catalog pages 1294-1295.

ORDER BY TRADE NAME FROM YOUR LOCAL JOBBER

ORIGINATORS AND PIONEERS OF STEEL UNIONS SINCE 1912

CLAYTON MARK & COMPANY

1900 DEMPSTER STREET • EVANSTON, ILLINOIS

They Say—

Oil Regulation Is Necessary

"Interstate control grew out of what amounted to a ruinous situation in the oil industry. Well and oil owners and lessees and royalty owners made every effort to bring their petroleum to the surface and rush it to the market. Everyone interested in a new well felt that he had to recover his highly fugitive oil before an offset well drained his supply. The flush oil market brought a ruinously low price and excess storage aboveground resulted in enormous loss through evaporation and other causes.

"State and interstate regulation simply brought order out of chaos. Proration proved itself a sound conservation measure. The war for quick recovery between well owners was halted. And by equalizing production with demand, a fair market was assured under the direction of the states.

"Nobody could argue that controls are perfect but interstate regulations has saved the oil industry in everybody's interest."

From an editorial in the Dallas Morning News.

Iran, Russia Getting Chummy

"The Iranian oil controversy no longer makes big headlines, and Iranian news now usually gets a small play on the inside pages if carried at all. Yet the struggle between Iran and Britain over the ownership of Iranian oil resources goes on, and events of considerable importance are related in dispatches from Teheran.

"What allied observers had feared seems to be taking place—the Iranians are getting chummy with Russia, and the Soviet Union, under Malenkov's new soft policy, seems to be making headway in improving relations between Moscow and Teheran.

"To make up for the loss of oil revenues, Iran still looks hopefully to the United States but such hopes . . . have been dashed by a letter from President Eisenhower. It served notice of this country's concern over the freedom permitted Communist activity in Iran, and advised that Iran cannot expect 'large scale' economic assistance until an agreement is reached with Britain on oil. . .

"Although Iran is receiving substantial aid from the United States . . . the implied promise is that much more would be forthcoming if our conditions were met. Iran would undoubtedly gain

they pick it ON PERFORMANCE

Cutler-Hammer

"Oil Country" Control

Steadily the preference for Cutler-Hammer Oil Well Pumping Control grows. Its performance *proves* it is the genuine Oil Country Control . . . built to oil men's practical specifications not only to start, stop and protect motors and equipment . . . but built to stop the oil country enemies of performance in their tracks.

Aluminum coated cases bounce back the sun's heat. Chimney-draft type ventilation sucks off heat, sucks in cooler air. (You never see a C-H Control cover door propped open to keep it running.) "Out in the open" contacts stay cooler, and, being vertical, shed dust. Ventilator openings are screened, louvred and baffled to keep out dust and dirt and bugs. Neoprene gasketing shields the timer. Excess clock motor torque keeps it ticking along.

Optional 3-coil overload protection ends single phasing; standard 2 coil suffices where single phasing is not a problem.

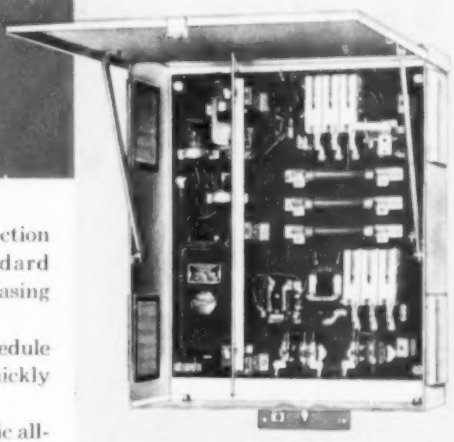
Any type of pumping schedule plus day omission is easily, quickly available.

There's manual or automatic all-at-once or time delay staggered starting available.

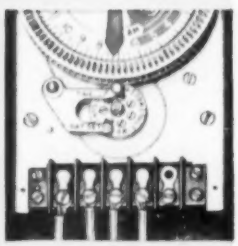
Lightning arrestors protect but don't blow up the works when they pop.

There's every reason in the world for this control's increasing popularity . . . *every reason in the world for you to investigate it too. You'll be glad you did.* CUTLER-HAMMER, Inc., 1453 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ontario.

Cutler-Hammer 9589 Oil Well Pumping Controller with 3 coil overload protection and time delay relay.



Day-omission feature—for non-operation any selected days of week.



Cutler-Hammer Program Time Switch gives automatically scheduled pumping, set up easily by means of pull tabs—one for each 15-minute interval.

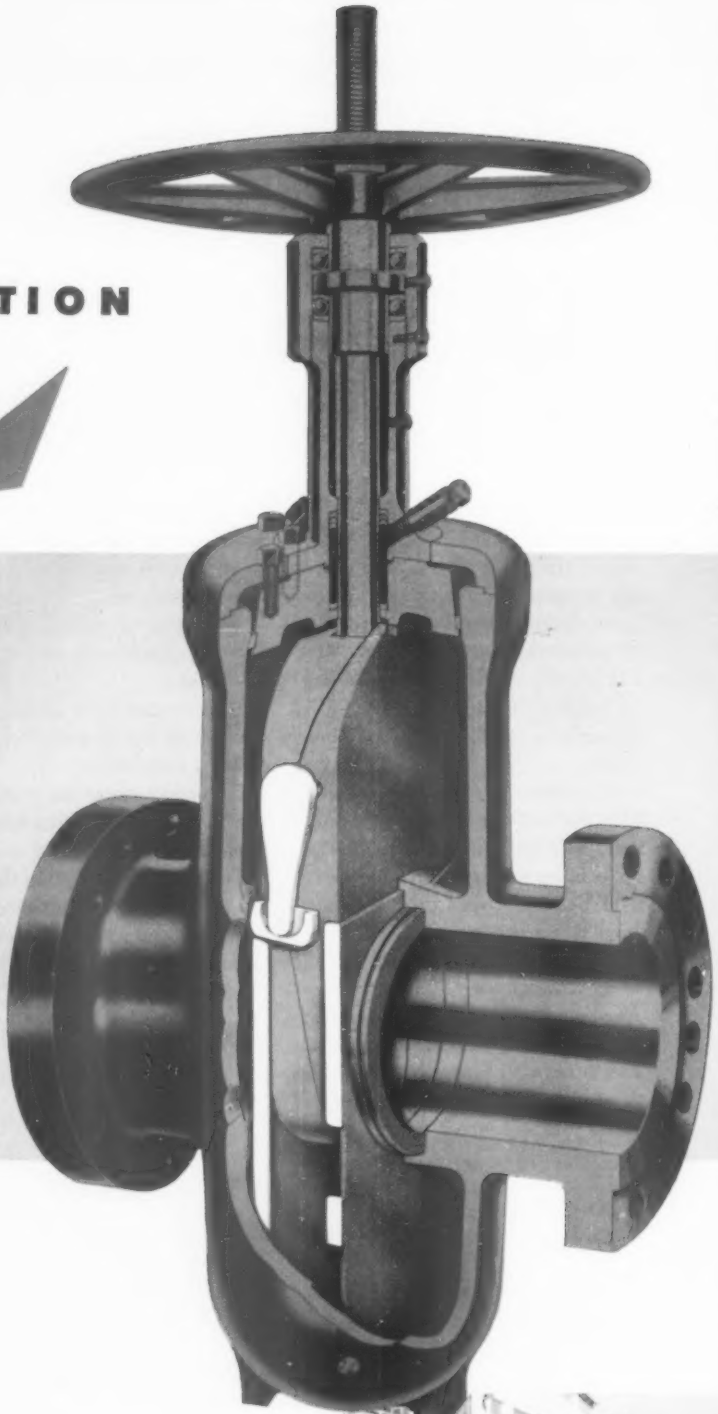
Eunice, New Mexico

Carter County, Okla.

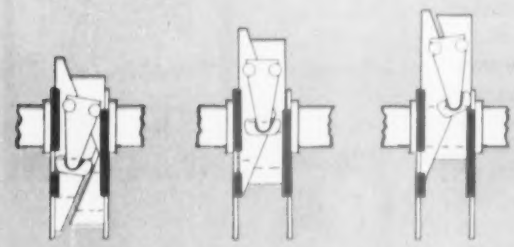
Scurry County, Texas

MEMBER AMERICAN PETROLEUM INSTITUTE

EXCLUSIVE LEVERLOCK ASSURES POSITIVE OPERATION in W-K-M VALVES



Leverlock action guarantees that W-K-M Valves always open and close efficiently. It controls neutral position of the gate and segment while opening or closing the valve . . . permits expansion of gate assembly *only* at proper time for seating in opened or closed position . . . assures positive controlled gate and segment pressure against *both* the upstream and downstream seats.



Gate and segment in closed position. **Neutral position.** **Completely open.**

The basic W-K-M Through Conduit Design and expanding gate have proved unequalled in the most severe tests. These, combined with Leverlock operation, no surge operation, simple maintenance, quick overhaul in the field, make W-K-M Pipeline Valves top standard for the industry. When you want dependable valve performance, specify W-K-M Valves all the way.

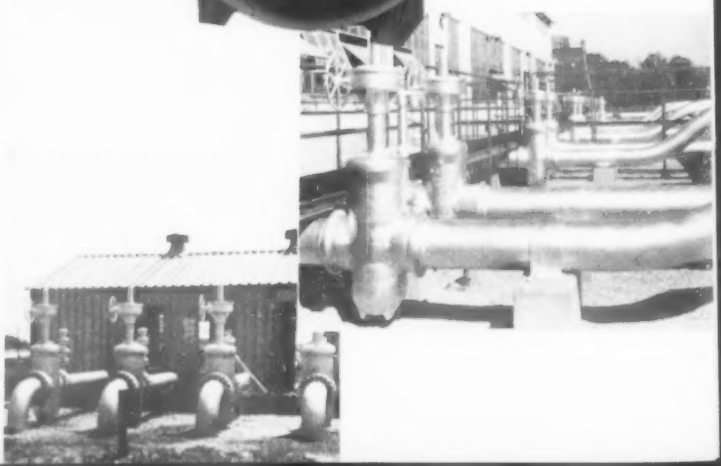
W-K-M COMPANY

P. O. Box 2117 Houston 1, Texas

2330 E. 8th St., Los Angeles, Calif.

Export Office: 30 Rockefeller Plaza, New York, N. Y.

W-K-M Valves



more than she would lose by playing ball with the United States."

Editorial in The Houston Post

Transportation Investments High

"Efficient and low-cost transportation is indispensible to the oil industry. And on the Mississippi, on the oceans, through its pipe lines and in its trucks, the oil industry has been performing miracles of efficiency.

"Figures show that since 1941, 30 of the large oil companies have invested almost $2 billion in new transportation facilities.

"Most of the $2 billion has been invested in new pipe lines. The amount invested in pipe lines totals about $1,200,000,000.

"But while pipe lines must always be the principal transportation agencies of the oil industry, other forms have not been neglected. Since 1941, these 30 companies have put $720,000,000 in marine transportation. Most of this, of course, has been invested in new tankers."

M. L. Gosney, executive vice president of Sinclair Oil Corp., at the launching of the S/S M. L. Gosney, Sparrows Point, Md.

Gas Industry in Civil Defense

"The civil defense program of each gas company should be designed to meet its own special conditions. There doubtless will be some variations in the programs of different companies, but the important consideration is that each company's plan should become an integral part of the over-all civil defense program. This calls for close coordination of gas companies with local and state civil defense organizations in developing a complete cooperative program that will function effectively under war-time emergency conditions.

"The gas utility's emergency operational program should be planned by a gas utility liaison representative on the staff of the local civil defense engineering services chief. Responsibility for restoration of the gas service should remain in the gas utility, and the liaison representative chosen by the utility . . . will be responsible to the civil defense director for coordination of the emergency repair and operation of gas utilities."

From a brochure by Howard C. Young, general engineer for the Federal Civil Defense Administration, Washington, D. C.

Principle, Not Money, Involved

"The coastal states have fought for principle in the tidelands controversy, and not for assured oil wealth running into fantastic figures. Any oil production from the area, be it large or small,

FAST—
ACCURATE—
SELECTIVE—
REMOTE TANK GAUGING

at the flick of a switch!...

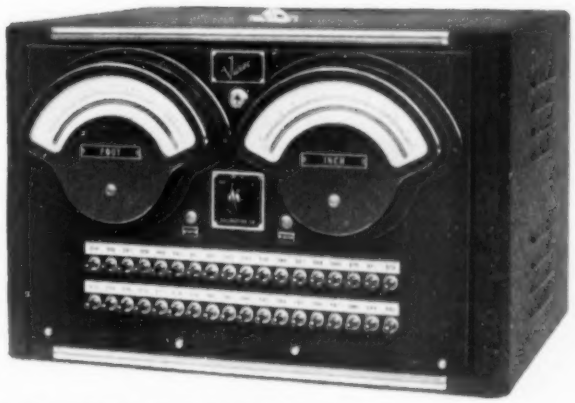


FIGURE NO. 9200-R KEY SWITCH TYPE

"Varec" REMOTE READING TANK GAUGE RECEIVERS

This newly designed "VAREC" Tank Gauge Receiver is equipped with 36 key-type switches instead of the usual dial selector. Tank selection is positive and more rapid. Human error is reduced to a minimum because each switch is associated with its individual tank. The Receiver design is flexible permitting easy custom panel installations when desired. Tank numbers may be changed to suit user's convenience. This latest addition to the "VAREC" line of Electronic Gauger Systems is fully described and illustrated in Bulletin No. CP-3003.

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Top Performance at Rock Bottom Cost

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GUIBERSON

TYPE B TUBING SPIDER

Stock sizes 1" to 3"; spiders are available on special order for 2" x 1" and 2 ½" x 1 ¼" parallel strings.

The Guiberson Type "B" tubing spider is a fast-handling, lightweight tool that can be handled by one man if necessary—and the cost of the "B" is lightweight, too. No other spider in its class offers greater economy, either initially or in the long run.

Despite its exceptionally light weight, the Type "B" spider will hold the longest string, and release instantly without sticking when you pick up. All slips fit the same bowl, and the "B" will not distort or damage tubing. Self-equalizing slips with hard, sharp teeth, give full, large-area contact, assuring positive grip, better load distribution and perfect release.

For positive performance, maximum protection, amazing handling ease and surprisingly low cost, you can count on the sure-grip "B" Tubing Spider.

THE GUIBERSON CORPORATION

ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.

Sold By Leading Oil Field Supply Stores Everywhere

of course will not be scorned. But those in other states who are animated by eagerness to participate in what they believe is the tremendous fortune to be derived from the tidelands might reflect that counting barrels of oil before they are brought to the surface is a highly speculative and often disappointing business."

From an editorial in the Fort Worth Star-Telegram.

CALENDAR

AUGUST

24-26 Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.

Aug. 31-Sept. 1 Interstate Oil Compact Commission, Northern Hotel, Billings, Mont.

SEPTEMBER

1- 4 American Institute of Electrical Engineers, Pacific general meeting, Hotel Vancouver, Vancouver, B. C.

6-11 American Chemical Society, national meeting, Conrad Hilton Hotel, Chicago.

9-11 Pacific Coast Gas Association, San Francisco.

11-12 Association of Desk and Derrick Clubs of North America, annual meeting, Cosmopolitan Hotel, Denver.

13-16 American Institute of Chemical Engineers, Fairmont and Mark Hopkins hotels, San Francisco.

15-16 American Petroleum Institute, executive committee, Greenbrier Hotel, White Sulphur Springs, W. Va.

16-18 National Petroleum Association, annual meeting, Hotel Traymore, Atlantic City, N. J.

21-22 Natural Gasoline Association of America, fractional analysis seminar, Texas Hotel, Fort Worth.

21-25 Instrument Society of America, national instrument conference and exhibit, Sherman and Morrison hotels, Chicago.

22-25 Corrosion short course, Texas A. & M. College, College Station, Tex.

24-25 Western Petroleum Refiners Association, regional meeting, Henning Hotel, Casper, Wyo.

27-30 American Society of Mechanical Engineers, annual conference, petroleum division, Rice Hotel, Houston.

Sept. 27-Oct. 2 American Society for Testing Materials, Committee D-2 on petroleum products and lubricants, Shoreham Hotel, Washington, D. C.

28-29 Independent Natural Gas Association of America, Shamrock Hotel, Houston.

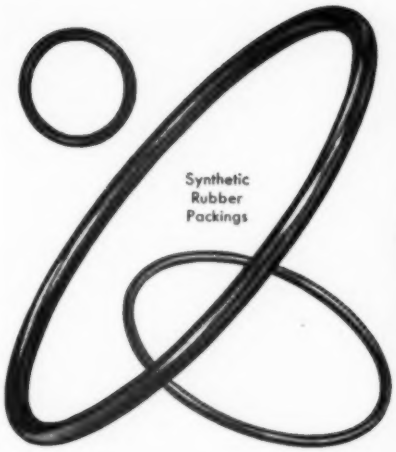
Sept. 30-Oct. 2. American Association of Petroleum Geologists, Mid-Continent regional meeting, Masonic Building, Wichita.

Sept. 30-Oct. 2 National Association of Corrosion Engineers, Permian Basin section, biannual field tour, Lincoln Hotel, Odessa, Tex.

OCTOBER

1- 2 Mid-Continent Oil and Gas Association, Louisiana-Arkansas division, annual meeting, Roosevelt Hotel, New Orleans.

4- 6 American Association of Oilwell Drilling Contractors, thirteenth annual meeting, Cosmopolitan Hotel, Denver.



you can TRUST a TROSTEL seal

every specification is pilot-tested for *Production Quality*

Because engineered packings and oil seals often require special processing . . . Trostel designs and builds the production tools entirely within its own organization.

As soon as laboratory development is completed, Trostel engineers pilot-test the entire production operation in miniature . . . in order to ascertain the processing and tooling techniques which will retain *in production* all of the special properties and tolerances called for in the customer's specifications.

The result is a packing or oil seal that can be produced to laboratory quality standards . . . in quantities of hundreds, or hundreds of thousands.

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Illustrated Bulletin On Request

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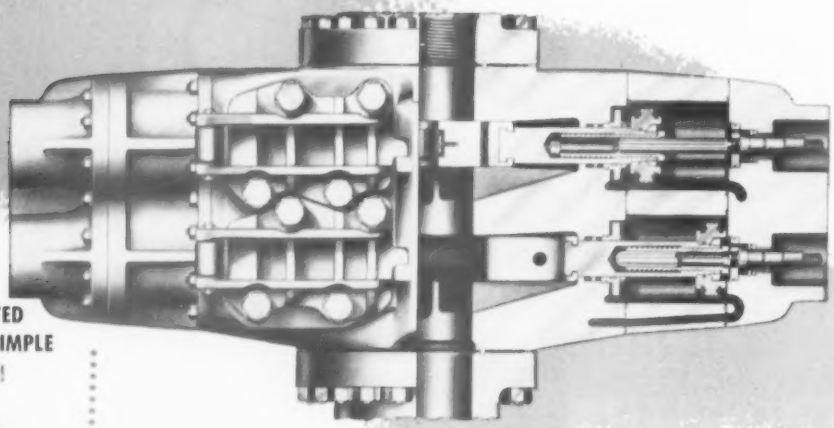
YOU GET COMPACTNESS THAT COUNTS

in height

in width

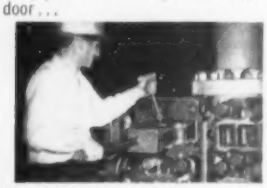
← in length →



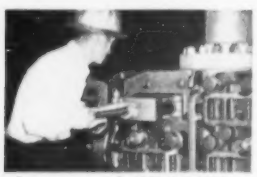
THE SHAFFER PATENTED SIDE-DOOR FEATURE IS SIMPLE AND SPACE-SAVING!

TO CHANGE RAMS IN A SHAFFER HYDRAULIC GATE...

1. Simply unbolt and open the side door...



2. Slide out the ram assembly...



3. Replace rams, and slide the assembly back in place...

4. Close and bolt the door.

Closing the door automatically aligns the ram assemblies in the gate body!

It's the simplest, fastest—and most space-saving design available. And complete ram changes can be made with pipe in or out of the hole!

Compactness is something to *double*-check when you buy cellar control gates. *Why?* Because overall dimensional data that *seems* comparable may not be at all similar on closer inspection.

For example — the Shaffer Hydraulic Double Cellar Control Gate in sizes as large as 13⅜" (12" Series 900) has an overall length of less than 89". (Smaller sizes even less.) This length is fixed — *there's no need to add additional cellar space to allow for opening and extending the gate in order to change the rams!*

Shaffer rams are quickly and easily changed through *side-opening* doors that open along the *minimum* horizontal dimension of the gate — therefore do not add extra space to the critical longest dimension of the unit!

Another space-saving advantage made possible by the patented Shaffer *side-door* feature is that no added space need be allowed *above* Shaffer Gates in order to change rams. You can mount Shaffer Hydraulic Cellar Control Gates even in cellars with minimum height and not have to worry about "working clearance" above the unit to allow for ram changes . . . because the rams are changed from the *side* — not from the top!

REMEMBER — the two most critical dimensions of a cellar control gate are length and height. Shaffer Hydraulic Cellar Control Gates do not require added space in either of these dimensions in order to change rams — a vital space-saving advantage that makes Shaffer compactness really mean something!

And compactness is only one of many unequalled advantages found in Shaffer Hydraulic Cellar Control Gates. Before you buy any cellar control gates, get the complete Shaffer story from your nearest Shaffer representative. Or write direct!

See your Composite Catalog for further data on Shaffer Products.

Send for your free copy of the complete Shaffer Catalog.

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CASPER, WYOMING, Shaffer Tool Works, Post Office Box 1788
EXPORT SALES OFFICE: Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U.S.A.

5- 7 Petroleum Electric Power Association, silver anniversary meeting, Muehlbach Hotel, Kansas City.
6- 7 Texas Mid-Continent Oil and Gas Association Rice Hotel, Houston.
7- 9 National Association of Corrosion Engineers, south central region, Mayo Hotel, Tulsa.
8- 9 California Natural Gasoline Association, annual fall meeting, Ambassador Hotel, Los Angeles.
11-17 Oil Progress Week.
12-16 Short course on cathodic protection, University of Illinois, Urbana.
16-18 New Mexico Geological Society, fourth annual field conference, El Paso, Tex.
19-21 American Institute of Mining and Metallurgical Engineers, petroleum branch, fall meeting, Dallas.
19-20 Independent Petroleum Association of America, annual meeting, Texas Hotel, Fort Worth.
22 American Institute of Chemical Engineers, New York section, symposium, Hotel New Yorker, New York.
22-23 Western Petroleum Refiners Association, regional meeting, Garrett Hotel, El Dorado, Ark.
22-24 Gulf Coast Association of Geological Societies, third annual convention, Shreveport.
23 Natural Gasoline Association of America, regional meeting, Blackstone Hotel, Tyler, Tex.
26-29 American Gas Association, annual conference, Kiel Auditorium, St. Louis.
27 Institute of Gas Technology, annual meeting, Chase Hotel, St. Louis.
27 Association of Consulting Chemists and Chemical Engineers, Inc., annual meeting, Hotel Belmont Plaza, New York City.
28-30 Seventeenth Technical Conference on Petroleum Production, Mineral Industries Building, Pennsylvania State College, State College, Pa.
29-31 Rocky Mountain Oil and Gas Association, annual convention, Cosmopolitan Hotel, Denver.

NOVEMBER

3- 4 Society of Automotive Engineers, national diesel-engine meeting, Conrad Hilton Hotel, Chicago.
5- 6 Society of Automotive Engineers, national fuels and lubricants meeting, Conrad Hilton Hotel, Chicago.
5- 6 American Association of Petroleum Geologists, Pacific section annual meeting, Hotel Biltmore, Los Angeles.
9-11 Geological Society of America, annual meeting, Royal York Hotel, Toronto, Ont.
9-12 American Petroleum Institute, annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.
12-13 Society of Exploration Geophysicists, midwestern meeting, Adolphus Hotel, Dallas.
19-20 National Association of Corrosion Engineers, western region, fall conference, Biltmore Hotel, Los Angeles.
19-20 Annual Instrument Short Course, Los Angeles Harbor Junior College, applied technology division, Wilmington, Calif.
20 Natural Gasoline Association of America, regional meeting, Herring Hotel, Amarillo, Tex.

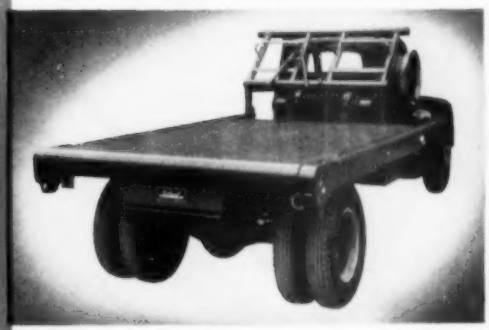
Nov. 29-
Dec. 2 American Society of Mechanical Engineers, Statler Hotel, New York City.

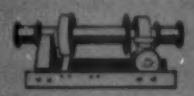
DECEMBER

1- 4 Corrosion conference, University of Oklahoma, Norman.
13-16 American Institute of Chemical Engineers, annual meeting, Hotel Jefferson, St. Louis.

It's your concern!

✓ Performance
✓ Safety
✓ Durability





THE LELAND "PACKAGED UNIT"

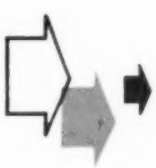
The "Packaged Unit" is the combination of two great pieces of equipment . . . the Leland Oil Field Truck Body and the Tulsa Winch — the perfect team for operations requiring gin pole winching.

Ball-bearing mounted rolling tail pipe with manual locking device. Safer, faster, easier on all winching operations. Heavy duty construction will last the lifetime of the truck.

Double or single gin pole pocket settings. These settings provide a wider rolling area.

The body deck plate is flush mounted over the rear half of the body offering a tempered plate protection as heavy equipment is winched onto the truck bed. The fore part of the body is center-matched hardwood flooring.

Headache rack is fabricated of heavy duty hydraulic tubing — 2½" and 3½". This rack offers positive protection to cab and driver on all loading and unloading operations.



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Among the hundreds of items available at the Leland Equipment Company you will find such well known names as: CLEVELAND Trenchers; LORAIN Shovels, Cranes, Hoes; CHICAGO PNEUMATIC Air and Electric Tools, Compressors; TULSA Winches; CMC Pumps, Mixers; BLAW-KNOX Clamshell Buckets, Forms, Bins and Batchers; DORSEY Low Bed Heavy Duty Trailers. A tremendous inventory of parts is maintained for your convenience, among which are: CLEVELAND, THEW-LORAIN, CHICAGO PNEUMATIC, and TULSA WINCH.

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TULSA, OKLAHOMA

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Editorial Assistants: Carolyn Carter, Tulsa, and Martha Allbright, Tulsa.

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Advertising Offices: TULSA, John D. Reilly, Mid-Continent Manager and George O. Ruppert, Representative, 211 South Cheyenne, Phone 3-6291; NEW YORK: Charles A. Wardley, Eastern Manager, and Robert N. Caird, Jr., Representative, 500 Fifth Avenue, Phone LOngacre 4-1750; CHICAGO: E. S. Klappenbach, Midwestern Manager, and David T. Kenney, Representative, 105 West Madison Street, Phone Central 6-2537; PITTSBURGH: Alfred M. Jones, Manager, 429 Fourth Avenue, Phone Atlantic 1-4835; HOUSTON: John M. Spears, Gulf Coast Manager, Sterling Bldg., Phone CHarter 4626; LOS ANGELES: Donald O. Hanson, Manager, 650 South Grand Avenue, Phone Vandike 0722; ENGLAND: Harry Becker, European Representative, 111 Thorley Lane, Timperley, Cheshire, Phone Ringway 4702.

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JOURNALLY Speaking

Journally Squeaking

ONE of our coworkers snapped this characteristic, if unflattering, shot of the conductor of this column assiduously courting the literary muse, and suggested that we print it to show readers (if any) what a guy who would write this sort of stuff really looks like.

In spite of our efforts at suppression, the picture was bootlegged around the shop and elicited some moving comments from the staff. Gerald Farrar, for example, was so touched that he broke forth into iambic tetrameter with this tender sentiment:

In his spreading leather chair
The Editorial Writer sat;
And sat and sat and sat and sat
And sat and sat and sat.

No other staffer dares disturb
This genius in this pose;
He's obviously hard at work
Composing deathless prose.

His feet aren't firmly on the ground,
His mind is traveling far;
He's thinking of what next to write—
Or else the Press Club bar.

Tell him not in mournful numbers
Life is just a printed page,
For 'tis plain to see he slumbers,
And it's no wonder, at his age.

As if that weren't enough, we caught Carl Hoot, another of our loving admirers, slipping this into our typewriter:

"Portrait of an editor in his ivory tower?

"This sneak photo may be an admission that he works, like anybody —or makes like working.

"People think editors of big magazines work other people, sit in plush offices, have pretty secretaries.

"It ain't necessarily so.

"Here is one in his natural habitat, surrounded by papers and litter that comes from (a) much research on piles of source material or (b) reluctance to clear off the desk.

"The look on his face is an indication of nothing. Probably nothing on his paper. He's looking to see if he has said anything, yet.

"Editors, and even people, are known to assume odd stances when concentrating. Also when sleeping.

"We think he's sleeping."

There was more of the same, but we're too modest to print all of the tributes. So that's what our dear colleagues think of us! Sleeping, eh? And all the time we were slaving over a hot typewriter. We want it understood that we never sleep in the office. What's a Press Club for, anyway?

Oh well, at least this gives us an excuse to get our picture in the paper. And it's one way of getting some contributions to help fill up this page without writing it all ourself these dog days. Guess we'd better take a vacation.

Basin Street

AS any beebop fan knows, old Basin Street was the home of the blues. Up in the Rockies region there's a whole "street" of basins which are anything but the blues for the oil industry. In fact, they constitute the most active and most promising oil area in the whole country.

Next week our favorite oil publication will have a big special section about these basins. Can you identify them from these descriptions: newest producing, biggest producing, most complex, most active producing, busiest, most promising for gas, newest intermontane, greatest gas-producing?

Check your answers in the Big Yellow Book next week.

—Henry D. Ralph

VOLATILITY

NATURAL GASOLINE
PROPANE
ISO-BUTANE
BUTANE
ISO-PENTANE
NORMAL PENTANE
HEXANE
HEPTANE
HEAVY NAPHTHA
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EXPORT TERMINALS: CORPUS CHRISTI, PORT ARTHUR, BAYTOWN, TEXAS CITY AND WARRENGAS, HOUSTON, TEXAS

Synthetic fuels are back in proper focus

THE Government's synthetic-fuels program is being cut down to proper size by the elimination of expensive and premature "demonstration plants" for making oil from coal. What is left of the program returns the federal Government to something like its proper role in research and brings the entire problem into correct focus.

The oil industry agrees that a certain amount of basic research into fundamental problems of future fuel supply is a worthy federal activity, though both oil and coal have pushed such research actively with their own funds. Controversy arose from the zeal (whether socialistic or just visionary) of a few bureaucrats in trying to force the start of a synthetic-fuels industry before it was technologically ready or economically justified.

SOMEDAY—no one knows when, but sometime in the future—the supply of petroleum may lag behind the demand so seriously as to cause a sustained increase in price. This will stimulate the search for alternate sources of energy. One of these may very well be synthetic fuel from coal. Then all government and private research on the subject will be drawn upon by industries seeking to meet the demand.

But this will be a gradual process. Oil and gas fields don't suddenly stop producing overnight. As scarcities develop, the economic factor of rising price will stimulate all sorts of efforts to provide more fuels.

The first efforts, logically, will be by existing industries to provide more of the fuels familiar to consumers. The oil industry will redouble its presently extensive research on methods of bringing to the surface the great quantities of crude oil known to lie unrecovered in reservoirs already drilled.

After that will come commercial experiments with new sources of fuels. At the moment it appears that oil shale is the most promising, but technology and economics might give the advantage to tar sands. Oil and gas from coal seem farther down the commercial road, but here again lignite might prove to be a better source than the bituminous which the federal researchers have favored. In the meantime other sources of energy, including atomic, may be moving from laboratory toward industry.

THE point of all this is that as long as private industry can see a hope of profit in filling an economic need there will be adequate incentive to keep the nation supplied with fuel, and competition among the different industries will find the best and cheapest method.

The Government's proper role in this is to do just enough fundamental research, outside the scope of commercial application, to open new avenues of thought to those whose business it is to produce fuels—not to incubate a premature infant industry.

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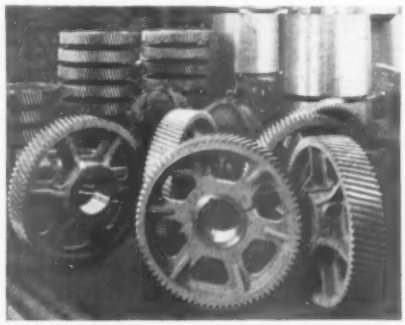

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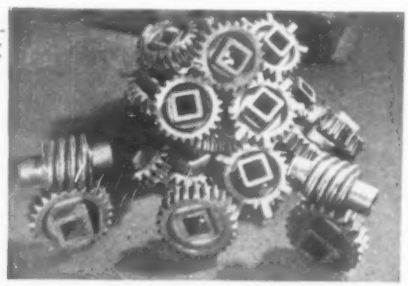


Small Gears ... also worms ... exemplify an application of Ductile Iron in the railroad field.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

THIS WEEK

WORLD'S DEEPEST is this wildcat of Ohio Oil Co. in Paloma field near Bakersfield, Calif. The test late last week broke the 4-year-old drilling-depth record of 20,521 ft. set in Wyoming by Superior Oil Co. and was coring ahead. The deep hole was expected to be carried to around 21,000 ft. in an effort to test the Eocene. For details on the new record-breaker, turn the page.

EXPLORATION.—Ohio Oil Co. sets new world's record for the deepest hole ever drilled and continues coring ahead on its deeper-pool test in California's Paloma field. . . . Ohio took the record established in 1949 when Superior Oil Co. 1 Unit in Sublette County, Wyoming, reached 20,521 ft. . . . No one would say how deep Ohio plans to drill, but the well is expected to reach about 21,000 ft. . . . ¶Cities Service Oil Co. plans immediate seismic exploration and wildcatting on more than 17,000 acres leased on the Dora Roberts Ranch, one of the last big West Texas ranches to be leased, in Midland and Ector counties. . . . ¶Monterey Oil Co. plans to start drilling a slant-hole wildcat to test area off Newport Beach after Labor Day. . . .

INTERNATIONAL. — Establishment of new Iranian Government opens possibilities for oil settlement. . . . However, victors do not include oil questions among eight reforms it promises the people. . . . ¶New tanker construction registers first decline since World War II. . . . ¶Cuban Government turns over idle rig to independent group, which plans deep wildcat. . . . ¶English firm plans to manufacture Platforming catalyst.

GOVERNMENT.—Industry spokesmen tell the House ways and means committee that the present 27½ per cent depletion allowance is essential to national security and vital to low consumer prices for oil products. . . . A spokesman for national oil marketers disputes the declaration and charges the depletion allowance is creating marketing monopolies. . . . ¶Interior Department plans to issue instructions soon to guide holders of state leases that will become U. S. leases under the provisions of Continental Shelf legislation. . . . ¶FPC is considering an examiner's decision that the sale of ethane and heavier hydrocarbon gases from the gas stream of a pipe line does not constitute a sale of natural gas. . . .

REFINING.—Texaco begins major expansion at Amarillo refinery which will double capacity to 17,000 bbl. daily. . . . New combination crude distillation and delayed coking unit will replace existing crude unit. . . . ¶Carter Oil Co. to ask for bids on world's first fluid coking unit within 60 days. . . . Unit will be erected in company's Billings refinery. . . . ¶Sinclair granted rapid-tax amortization for part of its $14,225,000 expansion project planned at its Marcus Hook refinery. . . . New units will include a 16,000-bbl. cat reformer, alkylation facilities, and petrochemicals units. . . . ¶New crude and products lines, together with expansion programs and new construction, enhance outlook for Rocky Mountain refiners, study shows. . . .

TRENDS.—Cumulative completions in the United States for the first 7 months of 1953 show a 2 per cent gain over the previous year. . . . Total weekly well completions since the end of June have set new records twice. . . . The week ended August 8 was an all-time record with 1,049 wells finaled. . . . Total wildcat completions for the month of July set all-time record for any one month with 1,114 test holes dug. . . . Cumulative wildcat completions drilled in 1953 show an 8 per cent gain over last year. . .

ACTIVITY.—Production of crude and lease condensate averaged 6,554,350 bbl. daily for week ended August 15, up 18,050 bbl. daily. . . . Operators completed 1,011 wells for the week compared with 1,049 for previous week and 864 for same week last year. . . . Wildcat completions increased 1 well to 233. . . . ¶Rotary rigs operating in the United States decreased 16 rigs for week ended August 17 to 2,620 with the biggest decrease noted in California. . . .

PIPE LINES.—Corps of Engineers seek construction bids for 610-mile Alaska products line. . . . Military officials say project will be difficult since line will cross frozen and marshy lands, and several rivers. . . . The $40,000,000, 8-in. line will run from Haines across British Columbia to Fairbanks, Alaska. . . . ¶Lakehead Pipe Line Co. pulls one line across Mackinac Straits in world's deepest pipeline water crossing. . . .

CORES FROM BELOW 20,000 ft. are examined by Gerald L. Farrar, engineering editor of The Oil and Gas Journal, during a visit to a record-breaking Ohio well.

CORING AHEAD and setting a new record with every turn of the kelly is this 5-year-old Ohio rig in Paloma field.

Depth Record Broken

Ohio Oil passes previous mark of 20,521 ft. after nearly 2 years of drilling on deep Eocene test in Paloma field

D. H. Stormont

BAKERSFIELD.—The world's record for the deepest hole ever drilled late last week passed from Superior Oil Co. to Ohio Oil Co.

Ohio's deeper-pool test in Paloma field passed 20,521 ft., the record set by Superior's 1 Unit in Sublette County, Wyoming, in 1949, and was coring ahead. No one would say how deep the hole might go before the operation ended. If difficulties are not encountered, however, it was expected that the well would continue drilling to about 21,000 ft.

When the well was spudded on October 23, 1951—almost 2 years ago—its objective was to test Lower Miocene, Oligocene, and Eocene oil possibilities below Paloma field's regular 11,000-ft. Upper Miocene pay.

Because the formations encountered were thicker than anticipated, it is considered unlikely that the original objective, the Point of Rocks sand in the Eocene, will be reached. At present depth the hole is thought to be still in Lower Miocene beds. Nearly all drilling below the regular Paloma pay has been in sands and hard shales.

Drilling data . . . A surface string of 13⅜-in. casing was set at 1,431 ft. and after the regular pay was penetrated a 9⅝-in. protective string was set at 10,947 ft.

From that depth on down is 7-in. open hole. Below about 12,000 ft. the hole has been almost continuously diamond cored. Periodically diamond bits were run to determine if they would drill faster than the core heads. While it was generally found that coring was slightly slower than drilling, the additional formation data obtained were felt to be well worth the slight increase in drilling time.

For all purposes, it may be said the well has been continuously cored from around 12,000 ft. to present depth. This certainly establishes a new depth record for diamond coring and probably for the extent of continuous coring.

While drilling has been slow because of the extremely hard shales encountered, during the past 8 months no serious problems have been met. Prior to resumption of drilling last January, however, about 2 months had been spent on a fishing job at 16,600 ft.

Another difficulty was encountered in July a year ago. While drilling at about 13,800 ft., a blow-out was threatened for a short while by hot, high-pressure water from a sand formation. Bringing it under control required use of 120-lb. mud. Since then, weight of the oil-base mud has been carefully maintained between 115 and 118 lb.

The rig . . . Drilling the well is a 5-year-old company-owned National 125, which previously had drilled a deep test in West Branch field in Michigan.

From Michigan it was brought to California, where it first was used on a 13,800-ft. dry hole in the Mountain View area southeast of Bakersfield.

Four 350-hp. gas engines are used to power the draw works, and two similar units drive the two 350-hp. main mud pups. The rotary table is independently powered by a twin-diesel through a torque converter drive.

The well is Ohio's 72-4 K.C.L.-A, being drilled with the assistance of other operators participating in the Paloma unit. No information has been released on oil shows, and it is believed that no shows of commercial importance have been encountered below the Paloma sand.

If the well is a failure in the deep zones, it is considered doubtful that it will be completed in the field's present pay formation because it would disrupt the 40-acre spacing pattern.

Drilling Island Ruling Near

SAN DIEGO. — A ruling by the Fourth District Court of Appeals on the drilling-island dispute involving Monterey Oil Co. and the city of Seal Beach may be forthcoming within a month.

The court took the case under advisement August 17 after hearing representatives of the oil company and city and state attorneys.

The controversy centers around a drilling island Monterey is attempting to complete 1½ miles offshore from Seal Beach, on a 1,255-acre state-granted lease. City authorities contend the city has police powers over construction inside the 3-mile limit. This claim was upheld by a Superior Court.

Monterey contends city drilling and building ordinances have no effect on its activities since it is operating under a permit from the State Lands Commission. The latter is supporting Monterey's claim, asserting that the commission has sole power to grant leases for drilling in submerged lands and this includes the right to construct facilities for drilling.

Newport Beach Test Planned

LOS ANGELES. — Oil possibilities offshore from Newport Beach will be evaluated by a slant-hole wildcat to be started soon after Labor Day by Monterey Oil Co.

The company has secured a community lease in which the city of Newport Beach and the state will share in royalties from any oil produced. Location of the upland site from which the well is to be drilled will be announced shortly, E. E. Pyles, Monterey vice president, said. The company has three small producers in West Newport field, located inland from Pacific Coast Highway.

Location of the planned wildcat is about 5 miles south of the Huntington Beach offshore oil field.

SOUTHWEST

Spraberry Looking Up

Capacity of pipe lines, gasoline plants soon will exceed field's gas output, may encourage resumption of drilling

Robert J. Enright

OPERATORS in Spraberry Trend Area field definitely are not giving up hope that Spraberry wells will pay out.

Not so long ago a good many of them probably would have sold out for little more than a plugged nickel. Developments since the first of the year, however, have made the outlook much brighter. Foremost among those developments are the Texas Railroad Commission's order early this year setting up 80-acre spacing in the field in place of the former 40, and the 25-cent boost in the price of crude oil east of the Rockies this summer.

Though producers are reluctant to make any sort of predictions concerning the future of the Spraberry, indications are that drilling activity in the field—practically nonexistent for some time—may perk up before long.

Pointing in this direction are plans and actual construction of both gasoline plants and pipe lines to take care of the casing-head gas produced in the field.

The huge field was almost completely shut in April 1 by the Railroad Commission for wasting 220,000,000 of an estimated 280,000,000 cu. ft. daily casing-head production. The order has since been modified to exempt those wells and gasoline plants from which all gas is utilized.

Pipe lines . . . El Paso Natural Gas Co. currently is gathering about 103,000,000 cu. ft. of gas daily in the field. The gas is residue from four gasoline plants.

About 36,000,000 cu. ft. daily comes from El Paso's Midkiff plant, 35,000,000 cu. ft. from Tex Harvey Gasoline Plant, Inc., to the north, 27,000,000 cu. ft. from the Texas Gas Products Corp. plant in the Benedum area (designated by the commission in July as a separate field with a full 21-day allowable), and about 6,000,000 to 8,000,000 cu. ft. from the Phillips Petroleum Co.-Plymouth Oil Co. plant in Benedum. This gas is transmitted to California by El Paso through the company's heavily loaded southern system.

Capacity for handling roughly 300,000,000 cu. ft. daily is expected to become available sometime in November, earlier than first expected, when Permian Basin Pipe Line Co. completes construction of its big-inch system north through the field and then northwest to Plains Compressor Station in Yoakum County, Texas, near the New Mexico state line. Permian is now pushing construction of the 30-in. portion of the line from Spraberry compressor station northwest to the Plains station.

Another 300,000,000 cu. ft. capacity will be available if El Paso Natural Gas Co. follows up a Federal Power Commission certificate approving a 30-in. line from Spraberry by way of Plains station across New Mexico and Arizona to California by the northern route through Gallup, N. M.

El Paso has already let contracts for construction of the line from Plains to Kingman, Ariz., but has not yet contracted the segment from Plains on into Spraberry. Pipe, however, is on order and scheduled for delivery next month.

In some quarters, it is thought El Paso may put off construction of this portion of the line until it becomes more apparent what operators in the Spraberry intend to do about drilling up the extensive proved but so far undeveloped acreage in the field.

Gas exchange . . . The company could postpone construction of the Spraberry segment of the line and still obtain sufficient Spraberry gas for the northern line by means of a unique gas-exchange agreement.

At the time FPC granted both El Paso and Permian construction certificates, it also approved a three-way gas swap involving the two and Northern Natural Gas Co., Permian's parent firm. Under the agreement Permian would deliver gas from West Texas and New Mexico fields to El Paso at Plains. El Paso would in turn deliver a similar amount to Northern at Dumas for the latter's markets in the North and Midwest *(The Oil and Gas Journal, April 6, page 62)*.

El Paso is now taking about 170,000,000 cu. ft. of residue gas daily from three gasoline plants in the Panhandle-Hugoton area. Under terms of the swap agreement, El Paso would be required to deliver about 300,000,000 cu. ft. to Northern at Dumas by the second year of operation. This would mean El Paso would have to supplement the Panhandle-Hugoton gas with some from further south, reversing the present flow of this line.

If, however, El Paso lays the extension into Spraberry—and it would have to have its certificate approving construction of the entire line amended by FPC if it should abandon the extension—total line capacity out of Spraberry would total almost 700,000,000 cu. ft. daily.

This would be more than twice the

World's Largest Sulfur-Extraction Plant

Texas Gulf Sulphur Co. operates this huge plant in Worland field, in Big Horn and Washakie counties, Wyoming. The plant processes the field's sour gas, which has a hydrogen sulfide content ranging up to 32 per cent, and has a capacity of 300 tons of elemental sulfur per day. The Worland gas is typical of sour-gas reserves in the Embar limestone (Permian) in the Big Horn basin. At the time this picture was taken Texas Gulf had an accumulation of sulfur more than 40 ft. high and 3,000 ft. long near the plant.

estimated present producibility of the field on the basis of allowables before the shutdown.

Plant capacity . . . There are now six natural-gasoline plants in Spraberry Trend Area field and the recently separated Benedum. Four of these are completed, one still building but already operating on a relatively small scale, and one nearly completed.

When construction of the latter two plants is completed, total gas-processing capacity will be approximately 733,000,000 cu. ft. daily—also well over twice the estimated producibility of the field based on pre-shutdown allowables.

The natural-gasoline plants in the Spraberry and Benedum areas, both completed and still under construction, include:

. . . Tex Harvey Gasoline Plant, Inc., continuing operations under the shutdown order. Processing capacity is about 33,000,000 cu. ft. daily.

. . . Phillips' Spraberry plant, shut down because of lack of a pipe-line outlet for residue gas. Capacity is about 110,000,000 cu. ft. daily. Plant will be hooked into Permian system.

. . . El Paso's Midkiff plant, now processing about 40,000,000 cu. ft. of gas daily. Construction will not be completed until after the first of the year. Its capacity when completed will be about 225,000,000 cu. ft. daily.

. . . Phillips' Pembrook plant, now nearly completed, which will have a capacity of about 68,000,000 cu. ft. daily. It, too, will be hooked into the Permian system.

. . . Phillips - Plymouth Oil Benedum plant, which has a capacity of about 85,000,000 cu. ft. daily and receives gas from both the Spraberry and the Fusselman. About half the capacity is available for Spraberry gas.

. . . Texas Gas Products Corp.'s Benedum plant, now in operation. This plant has a processing capacity of about 112,000,000 cu. ft. daily. It is handling about 57,000,000 cu. ft. of Spraberry gas in addition to that from Benedum's Fusselman and Ellenburger horizons. About 50,000,000 cu. ft. of the Spraberry gas is processed in remote absorbers in the Weiner Floyd area and the remainder in the Benedum plant for Benedum Sprayberry production.

A mere look at total plant processing capacity and total pipe-line capacity available, if El Paso carries out its approved project, would seem to indicate more gas production is expected in Spraberry in the future.

There are now about 2,300 wells in the big field. Though its outer limits are now conceded to be pretty well defined, there is still a tremendous number of proved locations which have not been drilled.

While any estimate of the number of these locations would have to be highly theoretical in view of questions on spacing, etc., it is thought by reliable sources that a totally drilled Spraberry would have three times the number of wells in the field at present.

The drilling of these wells awaits only the time when they will pay out.

Shut-Down Order Saves Gas

AUSTIN.—The State of Texas realized a daily saving of approximately 30,000,000 cu. ft. of gas during the month of April largely as a result of a shut-down order issued by the Railroad Commission for the Spraberry Trend area of West Texas.

In a report issued by the commission, data disclosed that a drop in total state-wide gas flaring from 27,600,000,000 cu. ft. in March to 18,700,000,000 cu. ft. during April was a direct result of the Spraberry field shutdown.

Texas' total gas production during April was 425,000,000,000 cu. ft., the commission said, of which 360,000,000,000 cu. ft. was marketed.

Expansion Begun

Texaco doubling capacity of refinery at Amarillo

AMARILLO, Tex.—Construction began last week on a major expansion and modernization program at The Texas Co.'s refinery here. The plant capacity, now 8,500 bbl. per day will be increased to almost double that volume, and its current force of 150 employes will correspondingly be almost doubled.

A new combination crude distillation and delayed coking unit will completely replace the present crude unit. The new facilities will permit the running of 15,500 bbl. per day of crude and coking of a 3,600-bbl. per day fraction of reduced crude.

Integration of these two operations will largely eliminate the need for intermediate storage facilities for various products and will permit certain towers, furnaces, and heat exchangers to handle product streams from more than one process unit. The combination unit will employ centralized control, and will allow for greater heat efficiency than is possible in nonintegratetd units of this type.

The refinery will be modernized by the addition of a 6,000-bbl. per day Orthoflow fluid catalytic cracking unit, whose total reactor capacity will run 10,000 bbl. per day including recycle stocks. A new polymerization unit will

produce at the rate of 470 bbl. per day of polymer gasoline. M. W. Kellogg Co. has been awarded a contract for construction of these larger processing units.

Also to be added at Amarillo are a catalytic reforming unit and an alkylation unit. Plant expansion calls for the construction of an entirely new steam boiler plant which will comprise three new 150,000-lb. per hour boilers together with their auxiliaries and a steam distribution system. New laboratory and warehouse buildings will be erected and new tankage for approximately 1,300,000 bbl. of crude and products will be added to existing storage facilities.

Texaco's Amarillo works is the oldest refinery in the Panhandle area. Built in 1918, it was acquired in 1928 from Reese S. Allen. When the current modernization and expansion program is completed in late 1954, the plant will produce aviation gasoline, a higher quality motor fuel, liquefied petroleum gas, kerosine, diesel fuel, and coke.

A second program for expansion and modernization is taking place at Texaco's El Paso, Tex., refinery. Construction work is under way on a new 10,500-bbl. per day crude unit which will replace present crude stills, and will double the refinery's crude capacity. As in the new Amarillo unit, the El Paso facilities will provide for delayed coking of topped crude in an integrated combination unit. El Paso will also have a new fluid catalytic cracking unit, a catalytic reformer, and a catalytic polymerization unit.

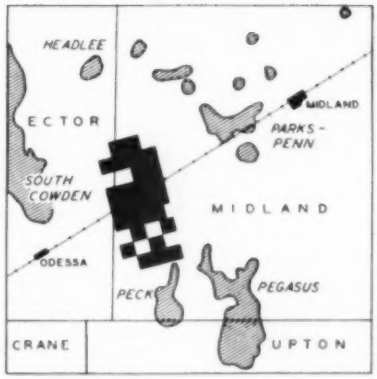
An entirely new boiler plant consisting of three 100,000-lb. per hour units, a new laboratory and warehouse buildings, and 834,000 bbl. of new tankage will round out the El Paso project. Completion of the construction program is anticipated for late next year. Foster Wheeler Corp. of New York is contractor for the major share of the El Paso project.

Merger Plans Incomplete

DALLAS.—It may be several months before officials of Delhi Oil Corp. and Taylor Oil & Gas Co. have a specific merger plan to present the stockholders of both companies.

C. W. Murchison, Delhi president, explained the desirability of such a merger at a special meeting of his own stockholders in July, but Delhi officials now say no specific plans for the move have been made.

Murchison revealed in July that Delhi owns slightly less than half of Taylor's 2,271,513 outstanding shares and proposed a merger of the two firms (*The Oil and Gas Journal, July 6, page 48*).



LEASED AREA of the big Dora Roberts Ranch is blocked out on the map above.

Texas Ranch Leased

$5,000,000 bonus paid by Cities Service, Forest

MIDLAND.—One of the last of the big West Texas ranches has been leased by Cities Service Oil Co. and Forest Oil Corp. as equal partners in a deal involving nearly 17,000 acres and a cash bonus of about $5,000,000.

S. B. Irelan, president of Cities Service, confirmed that the two companies have obtained oil and gas development rights on 26½ sections of the 20,000-acre Dora Roberts Ranch in Midland and Ector counties. The deal, subject to a favorable ruling by the Bureau of Internal Revenue, involves an annual rental of $1 per acre in addition to the cash bonus.

The accompanying map shows the blocks under lease. This land has never been drilled nor seismographed, but geophysical work will be started as soon as possible. Drilling obligation calls for an Ellenburger wildcat to be drilled on the acreage by Cities Service and Forest within 1 year. Forest will be operator, according to Dale H. Dorn, vice president and director of Forest.

Import of location of this vast area is readily seen from the map. Sweetie Peck and Pegasus fields to the south have their main production in the Ellenburger formation, but also produce from the Devonian, Pennsylvanian, and have a few wells in the Wolfcamp of lower Permian age.

Parks pool and all others shown on the map to the northeast of the blocks produce from Pennsylvanian beds. Headlee, 5 miles northwest of the tract, is another prolific Ellenburger pool, recently opened and under steady development. A completion this week (see area field reports this issue) has added Devonian as a second pay formation.

This week the north end of Sweetie Peck pool was extended to within two locations of the Dora Roberts Ranch land by Sinclair Oil & Gas Co. 14 June Sanders, Tract A, in 3-41-T4S-T&P Survey. On production test through perforations in the Ellenburger between 13,151-13,295 ft., this well flowed 1,104 bbl. of high-gravity oil in 22 hours through 30/64-in. choke.

Title to the Dora Roberts Ranch land recently passed from Mrs. Dora Roberts of Big Spring, original owner, to her daughters Mrs. Docia Brown, Fort Worth, and Mrs. Eloise Waters, Houston.

Allowable Cut

Texas reduces September output 119,691 bbl. daily

AUSTIN.—The first cut in crude-oil production allowables since April has been ordered by the Texas Railroad Commission for the month of September. Permissible production will be 3,005,443 bbl. per day.

The curtailment, resulting from 2 days' reduction in the number of producing days for state-wide fields, will amount to 119,691 bbl. daily. There will be 19 days state-wide flow permitted.

East Texas field, however, will be permitted a slight increase, by being allowed to remain on an 18-day producing schedule for the 30-day month.

Ernest O. Thompson, commission chairman, called attention to excessive stocks of crude, gasoline, and heating oils, in announcing following the proration hearing that the allowable was being slashed.

"There is no shortage of crude, gasoline, or heating oils," he said. "In fact, we're up to our necks in these products."

Spraberry ruling . . . The Railroad Commission ordered the big Spraberry Trend area of West Texas to remain on an 11-day production basis until there is a verified showing that facilities are available to handle the extra casing-head gas that would result from increased crude-oil production.

ALLOWABLES BY DISTRICTS

(Barrels daily)

District 1	45,304
District 2	154,457
District 3	478,138
District 4	268,078
District 5	50,565
District 6	133,809
District 7	255,153
District 7-B	143,795
District 7-C	184,827
District 8	945,507
District 9	254,849
District 10	90,962
Total	3,005,443

EXPANDING REFINERY is this one of Frontier Refining Co. at Cheyenne, Wyo. In the foreground is the newer portion of the refinery, showing the catalytic cracker now being expanded and other units for processing to light products. In background are black-oil processing units, including the asphalt plant. Present capacity is 13,000 bbl. per day.

Outlook for Refiners is Brighter

New pipe lines, processing facilities indicate continued growth throughout the region; fuel oil is still a problem

Gerald L. Farrar

DENVER. — The over-all Rocky Mountain refining picture has changed significantly in the last 18 months and now appears to be bright with prospects for comparatively slow but steady growth and modernization of facilities.

Most refineries in the region are running at capacity, in marked contrast to the situation in early 1952.

The change in the level of operation in the Rocky Mountain area is due to a number of interrelated factors, principally these:

. . . **Completion of new pipe lines** for transporting crude and products out of the area.

. . . **Normal growth** of the region and consequent increase in consumption of petroleum products, as well as an increase in per capita consumption.

. . . **The long-time over-all increase** in the tourist trade in the Rockies.

Other lines planned and under way will provide additional markets for products. These developments result naturally from the fact that there presently is an excess of refining capacity in the region.

New lines . . . The current pipe-line picture in the area, outlining recently completed lines, lines under construction, and planned lines, is shown on the accompanying map.

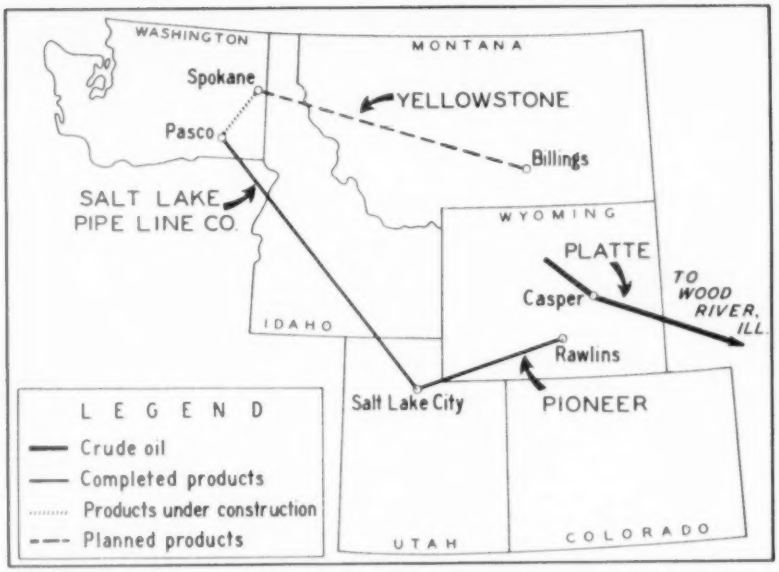
Continental Oil Co. is now accepting bids and buying right-of-way for the 540-mile, 10-in. Yellowstone products line from Billings to Spokane and the contract for construction is expected to be let in the near future. The line will have an initial throughput of from 20,000 to 25,000 bbl. daily and plans are for an ultimate capacity of more than 50,000 bbl. daily. Continental and Interstate Oil Pipe Line Co. are the principal owners of the line with Union Oil Co. of California and the H. Earl Clack interests owning a minority share in the project.

Carter is expected to expand its Billings refinery, which currently has capacity of 22,000 bbl. daily, and the Billings Continental refinery will probably undergo some expansion from its present 9,000-bbl. daily capacity. The Carter refinery will also have a new 3,000-bbl. fluid coker, the first of its type, developed by Standard Oil Development Co. *(See The Oil and Gas Journal, August 17, page 74).*

Tentative plans have been made by Sinclair Pipe Line Co. and R. A. Goodall of Ogallala, Nebr., to construct a 6-in. crude line from the Little Beaver field in Colorado to Toronto Pipe Line Co.'s system.

The recently completed Platte crude-oil pipe line is stimulating exploration, drilling and production activity in the Rockies, and this activity is being felt by the refiners in terms of increased demands for finished products. The Platte line is taking 100,000 to 110,000 bbl. per day of Rocky Mountain crudes from central Wyoming and surrounding areas to Wood River, Ill. *(See The Oil and Gas Journal, August 10, page 72).*

The Pioneer Pipe Line, now in operation between Sinclair, Wyo. (near Rawlins), and Salt Lake City, Utah, is delivering an average of some 12,000 bbl. daily of products to the Salt Lake City terminus *(see The Oil and Gas Journal, August 10, page 73).* At that point, connection is made with the Salt Lake Pipe Line, thus providing products transportation to Boise, Idaho; Pasco, Wash., and intermediate and surrounding territories. Now under construction is a 140-mile, 8-in. extension of the Salt Lake line from Pasco to Spokane. The project is expected to be completed by September 15.



NEW PIPE LINES which enhance the oil industry's outlook in the Rocky Mountains. Lines provide outlet for crude and also for products manufactured in the region.

No firm plans have been laid for a products line tentatively proposed by General Petroleum Corp. in April 1952. This line would connect the Socony-Vacuum Casper refinery to the Pioneer line at Rawlins, and thus to Pacific Northwest markets.

No additional plans are being made at this time, and no new developments are expected in the foreseeable future, according to sources at General Petroleum's Los Angeles office.

Cat cracking . . . In line with the current national trend, catalytic cracking operations are being extended throughout the Rocky Mountain area. Cat cracker additions are being made (or have been made), and new facilities are being installed.

Most of the additional capacity will be used to make more gasoline available for expanding markets, although there may be some slight increase in octanes. The octane levels throughout the area have remained fairly constant over the last 18 months at about 89 for premium and 82 for regular gasolines. These levels are more than adequate for the high-altitude driving throughout the mountains.

A midget U.O.P. fluid cat cracker, designed to process 3,500 bbl. of fresh-feed gas oil per day, has just been brought on stream at Bay Petroleum Corp.'s Denver refinery. A major expansion of cat cracking facilities is now under way at Frontier Refining Co.'s Cheyenne refinery. This U.O.P. unit will handle some 7,000 bbl. daily of fresh feed after revision, as compared with 2,500 bbl. daily at the present time.

Changes in other catalytic cracking units in the area to increase capacity have involved such measures as: (1) increasing air-blower capacity; (2) increasing size of waste-heat boiler to remove additional heat generated by burning more coke in the regeneration step; and (3) increasing regenerator pressure to reduce linear velocity through regenerator and subsequent cyclone separators.

Fuel oil problem . . . Rocky Mountain refiners operating on light, sweet crudes are able to reduce heavy fuel oil production to 10 per cent or less, based on crude charge. No trouble is being experienced in selling this quantity of heavy oil to the railroads, and consequently there has been no recourse to coking on the part of these refiners. One refinery has a delayed coker which has not been operated since its installation.

However, increased demand for light products has aggravated the fuel oil problem of refiners operating on heavy black crudes produced in some parts of the region. Nearly all of these refiners are coking, some with delayed cokers and others with shell stills or cracking furnace coils.

Nearly all these plants need to install new coking facilities and interest is high in the new continuous processes now in development. The older processes are inefficient and costly, thus pointing the need for the promised improvements.

Asphalt picture . . . Demand for asphalt is on the increase throughout the mountain states, the Pacific Northwest, and the Midwest. These states are accelerating road construction and maintenance programs, and they are turning to asphaltic paving materials for an increasing percentage of this work.

Specifications in most states preclude the use of cracked asphalts in building programs. Products must pass the negative spot test before they are accepted. However, a few states are now permitting use of asphalt blends which contain comparatively large amounts of cracked stocks, particularly in road maintenance and repair work.

In one state comparisons made on adjacent highways show little or no difference in performance of straight-run and blend stocks containing cracked materials.

Several refiners are producing oxidized asphalts to be used for preparation of asphalt blocks. Principal use for the blocks in the mountain states is for lining irrigation canals. Demand for the blocks is increasing since the canal systems are being greatly expanded in the semiarid areas.

Other processing . . . Proportionate demand for fuels is perhaps greater in the Rocky Mountain than for any other section of the nation. Dieselization trends for railroads and heavy trucks, begun several years ago, are continuing.

One refiner who is unable to meet the demand for diesel fuel expressed concern over the trend of continuing dieselization. Straightrun diesel stocks make prime feed for catalytic cracking units, and excessive demands if met cut down on gasoline production.

It is his opinion that if demand for diesel fuels continues to increase disproportionately a sharp price increase will result, with diesel price ultimately approaching that of gasoline. Most refiners, however, are able to meet diesel fuel demands without difficulty.

It is the almost unanimous opinion of the area's refiners that a partial swing to the use of heavy fuel oils on the part of the railroads would result in substantial savings. Increased firing difficulties over lighter fuels can easily be overcome since regular firemen are on continuous duty.

Refiners with propane deasphalting and vacuum distillation facilities are particularly well suited to meet the region's processing problems. Propane deasphalting produces a top quality product and increases available cat cracking feed stock, thereby reducing heavy fuel production.

Approximately the same results are obtained by vacuum distillation of the reduced crude fraction, although asphalt quality is not quite so good. Most refiners not presently equipped with

one of these processes are eying one or the other with increased interest as processing problems become more acute.

Future markets . . . Markets in the next 2 or 3 years will probably be somewhat soft for a time as new refineries are completed. Considerable refining capacity is planned or currently being installed in two important areas which are providing substantial markets for refined products from Rocky Mountain refineries.

New construction in the Williston basin and the Pacific Northwest is shown in the attached table.

A plant with capacity of 33,000 bbl. daily is under construction in the Williston basin, and combined capacities of two more planned plants amount to 31,500 bbl. daily. Total combined capacity of the three new refineries is 64,500 bbl. capacity. Figures on a fourth plant are not yet available.

Under construction in the Pacific Northwest is a refinery with capacity of 35,000 bbl. daily. Planned for this region is another plant with 10,000 bbl. daily capacity. Total new capacity, with figures not available on a third planned plant, amounts to 45,000 bbl. daily.

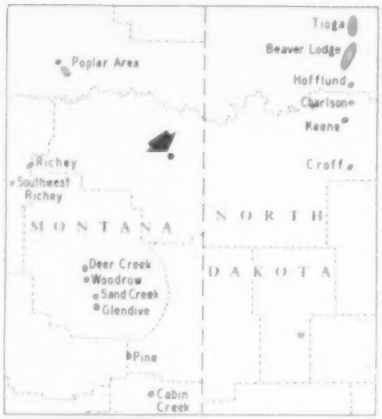
These new refineries will undoubtedly cut into the markets now served by the Rocky Mountain refineries, as well as those served by Midwest and Pacific Coast plants. However, this situation is expected to be ironed out in time, due to the rapid development of these areas. Population is expected to increase sharply, and per capita consumption of petroleum products is expected to continue at its present rapid pace.

Ammonia Plant Proposed

SALT LAKE CITY.—Utah Chemical Co. of Salt Lake City is planning construction of an $18,500,000 synthetic anhydrous ammonia plant to be located in central Sanpete County near Clear Creek gas field.

Application has been filed for a certificate of necessity. Catalytic Construction Co. of Philadelphia will be the contractor for the plant. Natural gas from Clear Creek field, believed to be a major new reserve, will be supplied by the pipe line of Central State Utility Co.

The new petrochemical plant will be capable of producing 300 tons of anhydrous ammonia per day. This basic production will be converted to the manufacture of nitric acid, ammonium nitrate, and urea, to serve an extensive agricultural region with synthetic fertilizer chemicals.



PRODUCING WELL completed by Phillips Petroleum Co. off the Nesson anticline in the Williston basin is indicated by the arrow. In the lower right on the map is Amerada Petroleum Corp. 1 May now drilling below 12,300 ft.

Williston Wildcat Completed

GLENDIVE, Mont.—The first producing well in the central part of the Williston basin off the Nesson anticline was completed last week by Phillips Petroleum Co. and Sun Oil Co. in Richland County.

The rank wildcat, the 1 Dynneson, is Montana's deepest hole. It was drilled on a seismic prospect 44 miles southeast of East Poplar field, the nearest producing area. The well flowed 745 bbl. of 48°-gravity oil in 24 hours through a 20/64-in. choke following a 2,000-gal. acid treatment of Red River (Ordovician) perforations at 12,585-605 ft.

Tests on Amerada Petroleum Corp. 1 May in Billings County, North Dakota, have indicated this wildcat also has commercial production. The 1 May, now drilling below 12,300 ft., is 60 miles from the nearest proved production *(For a discussion on this general area and for details on the Phillips-Sun well see The Oil and Gas Journal, April 27, page 333 and July 6, page 137).*

Wyoming Crude Line Planned

CASPER, Wyo.—Powder River Pipe Line Co. is being formed to build a crude-oil system in the Salt Creek and Casper areas of Wyoming. R. J. Hoffman, American National Bank, Cheyenne, Wyo., is one of the incorporators.

Plans call for building 40 miles of 8-in. and 12 miles of 6-in. plus gathering lines. The system would extend from Salt Creek field northwest to Kaysee, Wyo., and thence northeast along the route of Northern Utilities Co.'s natural-gas line.

NATIONAL AFFAIRS

Tax Changes Discussed

Industry spokesmen say depletion allowance is essential for national security; opponents charge market monopoly

WASHINGTON.—National security and low consumer prices for oil products depends upon continuing the present 27½ per cent depletion allowance, the House ways and means committee was told this month as it wound up hearings to aid in a thorough revision of the tax laws next year.

These views were presented to the committee by Lt. Gen. Ernest O. Thompson, chairman of the Texas Railroad Commission, and James P. Jones of Bradford, Pa., appearing on behalf of the New York State Oil Producers Association, the Bradford Pennsylvania Producers Association and the National Stripper Well Association. A brief submitted jointly by the Mid-Continent Oil and Gas Association, Independent Petroleum Association of America, Western Oil and Gas Association, American Petroleum Institute and the Rocky Mountain Oil and Gas Association concurred in those conclusions.

Dissident views were presented by Paul E. Hadlick, general counsel for the National Oil Marketers Association, who charged the depletion allowance and the expensing of drilling and development costs are leading to monopoly in the marketing branch of the industry.

Thompson told the committee the United States does not have "half enough" ready reserve oil-producing capacity for its national security, and warned this is a bad time to put tax revenues above the nation's safety.

"Come war, there would be no time to hunt for places to drill oil wells. That takes years at best. To be useful for defense, the oil wells must have already been drilled. Reserves lying undrilled are of no value and there would be no time to drill them; there

would be no steel available for the drilling. The oil wells must have already been drilled, equipped and ready to produce, hooked up and connected to the pipe lines and to refineries of ample capacity, ready to make the products required in sufficient quantities and of proper quality," Thompson said.

Without depletion, Thompson said, there would be little risk drilling and our domestic oil supply would "shrivel" and leave us dependent upon foreign oil which might be denied us in time of war.

In the past 25 years, under the depletion allowance, the industry has invested approximately $25 billion in the search for oil, drilled about 640,000 wells and discovered and developed 48 billion barrels of new oil, Thompson said. But serious consequences would follow a reduction in the allowance, he told the committee, among them:

. . . **Increases in product prices** because of added costs and scarcity.

. . . **Diminished incentive** to risk capital in exploration and development.

. . . **Diminished discovered** underground reserves which will jeopardize the military preparedness.

. . . **Curtailment** of small stripper well operations.

. . . **Reduced federal tax** revenues because of curtailed operations.

. . . **Reduced individual income** because of restricted industry payrolls.

. . . **Reduced dividends** to industry shareholders and discouragement of investment.

The depletion allowance is a major incentive to the adoption of water flood and other methods of secondary recovery by the operators of the nation's 320,000 stripper wells, Jones testified. These wells tap estimated reserves of almost 7 billion barrels, or approximately one-fifth of the national total, and nearly half of this will be obtainable only by secondary recovery methods, he said.

The alternative to a reduction in the allowance, from the producer's viewpoint, would be an increase in the price of his crude oil, with subsequent higher costs to consumers, Jones warned.

Far from making fabulous profits because of depletion, the oil industry's income has been lower than that of manufacturing corporations over a long period of years, the brief of the five associations set forth.

Statistics were cited showing that the average return on capital invested over the 28-year period since 1925 was 10.1 per cent for oil companies and 11.3 for manufacturing. In only 5 of the past 28 years did oil earnings exceed those from manufacturing.

Hadlick charged the allowance is a

WATCHING WASHINGTON

Bertram F. Linz

Price Probe Significant?

The Justice Department's investigation of the recent increases in the prices of gasoline and oil may be considerably more significant than indicated by developments so far, it is believed in informed circles in Washington.

In a rather disarming letter to Senator Hubert H. Humphrey of Minnesota, Asst. Atty. Gen. Stanley N. Barnes, head of the antitrust division, wrote merely that the department is encountering great difficulty in securing evidence to support charges of agreement or conspiracy among the oil companies.

Barnes said the investigation would be continued and later disclosed it had been turned over to the Federal Bureau of Investigation. Later, however, it was indicated the FBI had been on the job already for a considerable period.

Justice officials aren't talking about the matter, but there is an idea in other quarters that the department may be preparing to test the legality under the antitrust laws of the "follow the leader" pattern by which the oil companies set their prices.

A year or so ago there were reports that the Federal Trade Commission had some ideas that "follow the leader" pricing should be challenged as another of the price-fixing methods frowned upon by the antitrust laws, but no definite moves were made to follow the idea through. In view of the steady flow of complaints against this method of setting prices that comes in to Washington, however, many observers believe that sooner or later the government will be forced to test its legality.

Plant Transfer Complicated

The government finally has decided to dispose of its big synthetic rubber industry, but it will be March 1955 before private owners take physical possession of the facilities.

Although original proposals called for quick disposal of the plants, Congress felt that better distribution and better return to the government would be accomplished by more leisurely action. Thus, instead of calling for bids in a period of 45 to 90 days, the bidding period will run for not less than 6 months. Thereafter, the disposal commission is given not less than 7 months in which to negotiate with those who submit proposals, instead of 4 months as first suggested.

Following this, the Attorney General must render an opinion to the commission as to whether the proposed sales will violate the antitrust laws. After the negotiations have been completed, the commission will send its report to Congress, recommending prospective purchasers, and the Attorney General also will submit a report approving the proposed disposals. Both reports must be submitted to Congress by January 31, 1955, and 10 days is given for the introduction of resolutions of disapproval for any facility.

If any sale is rejected, all purchasers have the right to withdraw from their proposed purchases.

Oil Ventures Not "Hobbies"

Provisions to take oil ventures out of the realm of "hobbies" will be offered as part of the tax-revision bill to be written by the House ways and means committee next year.

The "hobby" section of the present law is aimed at wealthy taxpayers who run farms, racing stables, or other ventures at losses which they would like to claim as tax deductions. It provides that where net losses exceeding $50,000 a year are incurred for five consecutive years, the tax for each year must be recomputed. The taxpayers cannot deduct more than $50,000 plus the gross income for any one year.

As now written, according to Committee Chairman Daniel A. Reed of New York, this provision applies to legitimate business ventures as well as hobbies and is seriously interfering with oil and gas exploration and development.

Reed points out that many oil and gas projects take more than 5 years to develop and losses in excess of $50,000 a year may easily be experienced over a long period. His point is that the government should encourage ventures looking toward the exploration and development of our natural resources and not discourage them.

subsidy which returns his capital to the producer "over and over again." He admitted his associates would have no complaint if the tax benefits accorded producers were kept in the producing end of the business, but alleged they are used to subsidize losses in the marketing branches of the integrated companies, driving independent distributors out of business.

Shelf Lease Answers

Government will furnish instructions on procedure

WASHINGTON.—Procedures to be followed by Continental Shelf operators to insure federal validation of existing state leases will be announced in the near future by the Department of Interior.

Under the law providing for federal control of the Continental Shelf beyond state boundaries, operators holding leases issued by the states before Texas and Louisiana decisions may continue to hold them as federal leases if they meet 11 requirements spelled out in the act.

The transfers must be made within 90 days after the president signs the law, making the deadline early in November. The department is now preparing an announcement to inform operators where they should file and to whom deficiencies in rentals, royalties, or other payments should be made.

Meanwhile, the department is preparing to return to the states some $5,000,000 paid by operators on leases within state boundaries and held in escrow pending settlement of the tidelands issue.

Funds from operations beyond state boundaries will be paid the federal government, but there may be some areas where the line dividing state and federal lands will have to be determined.

Petrochem Ruling

Ethane, other products not natural gas, examiner says

WASHINGTON.—The Federal Power Commission has under consideration an examiner's decision that the sale of ethane and the heavier hydrocarbon gases while in the gas stream of Panhandle Eastern Pipe Line Co. is not a sale of natural gas and is not subject to FPC jurisdiction.

The decision also holds that an extraction plant operated for National Petro-Chemicals Corp. to remove these components is not a facility for the transportation of natural gas in interstate commerce and likewise is not subject to the commission's jurisdiction.

The decision rejects a contention by the FPC staff that the movement of the gas by Panhandle and through the extraction plant is subject to commission control. It will become final at the end of 30 days unless exceptions are filed within 20 days or the commission institutes a review on its own motion.

Under the decision, Panhandle will be authorized to construct facilities for the delivery of natural gas to the petrochemical company's plants near its Tuscola, Ill., compressor station. The petrochemical company was organized and is owned by Panhandle and National Distillers Products Co.

The Tuscola facilities include an extraction plant, operated by Panhandle at the entire expense of Petro-Chemicals, to remove ethane and heavier hydrocarbons from the pipe-line company's natural-gas stream for use in a chemical plant designed to produce ethyl alcohol, ethyl chloride and other organic chemicals.

The decision authorizes Panhandle to deliver, on an interruptible basis, natural gas for use as fuel in Petro-Chemicals' extraction and chemical plants (see page 178).

Alaskan Line Bids Due

Engineers expect 610-mile military products pipe-line to provide a number of "headaches" for its contractor

WASHINGTON. — Bids for construction of the new Alaskan military products pipe line are being invited by the Portland, Ore., office of the Army Corps of Engineers, and the contract is expected to be awarded in about 6 weeks.

Military officials in Washington see construction of the line providing plenty of headaches. Some of it will have to be laid on the "permafrost," the ever-frozen underground of the Far North about which little is known. In another section, it will have to be laid for 5 miles on the bed of a lake, and there will be several river crossings. Army engineers see possibilities of difficulties in the welding of the pipe and laying it across the marshy areas along the route.

The 610-mile, 8-in. products line to run from Haines to Fairbanks has been under consideration for several years. It has been slow in getting under way because of the necessity of securing the permission of the Canadian government to run the line across British Columbia and Yukon Territory. That permission has now been secured and the contract for construction will be let promptly in the hope the contractor will be able to secure materials in time to drop pipe along the route and move in machinery and equipment this winter when the roads will be in best shape.

Congress has made two appropriations totaling $40,000,000 for the line, which will have three pumping stations. The toughest climb will be near Haines, where there is a 2,500-ft. rise in a distance of 10 miles. Army engineers did not disclose the proposed capacity of the line, pointing out that the product movement will depend upon international conditions, available appropriations, possible expansion of military activities in Alaska and other factors.

Under the agreement with Canada, that country can take products off for its own military requirements along the 284 miles of the line which will be laid in Canadian territory. Officials said they know of no present Canadian military installations along the route. Provision also will be made for the transport of civilian products when the line is not required by the U. S. military, but an Army spokesman said no immediate civilian demand was foreseen.

Haines was selected as the jumping-off spot because products can be brought to it by tank barge or other carrier from the U. S. West Coast in protected waters less vulnerable to enemy attack and storm danger than the open sea. Haines is an all-year port and will be provided with the necessary docking facilities. Storage facilities will be built at both Haines and Fairbanks.

From Haines, the line will run almost due east along the route of the road from the port to the Alcan Highway and will then follow the latter to Fairbanks. Once over the 2,500-ft. hump in the south, the line will run generally downhill the rest of the way. It is not proposed to run the line on the highway but along an adjacent 50-ft. right-of-way which will have to be cleared. Title to the riight-of-way in Canada will remain with the provincial government in British Columbia and the Canadian government in Yukon Territory. The U. S. will hold only an easement for it for a minimum of 20 years, and longer if mutually agreeable to the two governments.

HORTON FLOATING ROOF

Oil Tank Hit by Lightning

Heavy Hail and Rain, Power Wires Blown Down

An electrical storm, accompanied by heavy hail and rain, caused widespread damage in the St. Louis area, plunged several thousand homes into darkness and stalled rush hour traffic yesterday afternoon.

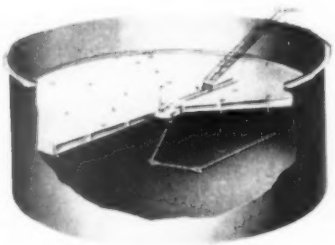
Manhole covers were displaced by the torrents of water racing through the storm sewers, and many [illegible]

Lightning Strikes Power Line and Gasoline Tank

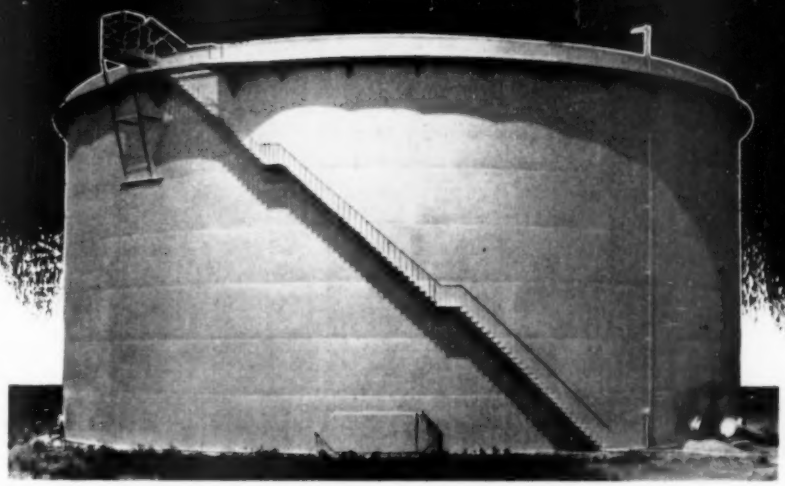
Three hundred families were without power from 6:30 PM to 7:00 PM because of lightning striking a power line at Illinois' Route 3 and Monsanto Ave. in Monsanto.

Lightning also struck the top of a huge gasoline tank in Monsanto ½ mile east of Route 3. A small fire, fed by gasoline vapors, was quickly put out by employees of Socony Vacuum Oil Company's Lubrite Division.

That was because [illegible] floating lid, [illegible] on the



Above: Cutaway view showing construction of a Horton Double-Deck Floating Roof.



saves tank a second time from destruction by fire

For the second time, a 130,000-bbl. gasoline tank at the Socony Vacuum Oil Company refinery at East St. Louis, Illinois, has been struck by lightning. And, for the second time, the Horton Double-Deck Floating Roof has saved the tank from destruction by fire.

The tank was originally hit during a violent electrical storm April 28th, 1950. It was again hit on March 16th, 1953. Damage and loss both times were small and the fires were quickly and easily extinguished . . . thanks to the Horton Floating Roof.

The bottom of a Horton Floating Roof is normally in contact with the liquid in the tank. Blanketing the entire surface of the liquid in this manner eliminates the air necessary to support combustion. The Horton Seal—standard construction on all Horton Floating Roofs—closes the space between the deck and the shell of the tank so effectively that there is not enough vapor to support an extensive fire or explosion.

Write our nearest office for information, estimates or quotations on Horton Floating Roofs for your storage tanks.

CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Atlanta, 3	2154 Healey Bldg.	Detroit, 26	1514 Lafayette Bldg.	Philadelphia, 3	1615–1700 Walnut Street Bldg.
Birmingham, 1	1536 North 50th St.	Havana	402 Abreu Bldg.	Pittsburgh, 19	3228 Alcoa Bldg.
Boston, 10	1025-201 Devonshire St.	Houston, 2	2119 C & I Life Bldg.	San Francisco, 4	1554–200 Bush St.
Chicago, 4	2128 McCormick Bldg.	Los Angeles, 17	1523 General Petroleum Bldg.	Seattle, 1	1325 Henry Bldg.
Cleveland, 15	2204 Mid'and Bldg.	New York, 6	3347 165 Broadway Bldg.	Tulsa, 3	1606 Hunt Bldg.

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Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Metalliques de Provence, Arles-sur-Rhone, France
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Comprimo, N.V., 21, Amstel, Amsterdam (C) Netherlands
Compagnia Tecnica Industria Petroli, Rome, Italy
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NEW HOME of the FPC is the General Accounting Office Building at Fifth and G Streets.

FPC: It's Always in the Middle

Agency's toughest chore is rate fixing—guaranteeing a fair shake to both gas consumers and transmission firms

Bertram F. Linz

THE Federal Power Commission currently is in one of the toughest spots it has experienced in its long and sometimes tempestuous career.

One of the oldest of the federal regulatory agencies, the FPC exercises what practically amounts to life or death authority over the natural-gas industry through its regulation of interstate transportation and sale.

Because the long-distance gas lines generally have a monopoly in the areas they serve, the commission limits their earnings in the interest of the public. On the other hand, because they are so closely regulated, the commission seeks to insure that they make fair profits in the interests of the companies' own operation and of investors. The balancing of public against company and investor interests is a continuing problem which today has assumed massive proportions.

Rate - fixing problem . . . During the first decade of its administration of the Natural Gas Act the commission made a strong effort to reduce previously unregulated charges that it felt were exorbitant and succeeded in making reductions amounting to about $48,000,000 a year.

In 1949, however, rising costs of material, labor, and gas reversed the pattern and the commission found it necessary to consider applications for rate increases. These applications started as a mere trickle but with the increases in costs which have occurred in the past 2 or 3 years the flow has assumed flood proportions, with some companies filing for a second or even a third increase before their first applications have been disposed of.

Since 1949, applications for rate hikes have exceeded a quarter-billion dollars. Each application brings vigorous opposition from the states and communities which will be affected, and the commission must weigh the revenue rights of the pipe-line companies against the natural resistance of consumers to higher prices.

The commission moves slowly and cautiously in dealing with rate applications, attempting to put a brake on rising rates without jeopardizing the earning ability of the companies. In 1952, for instance, it acted on 30 applications calling for hikes of $149,000,000 a year, allowing only some $27,000,000 to become fully effective and $8,600,00 to become effective under bond pending final decision, rejecting or permitting withdrawal of another $12,500,000 and holding $100,000,000 under suspension.

How it started . . . Originally established by Congress in 1920 to administer the Federal Water Power Act adopted in the same year, the Federal Power Commission first was composed of the Secretaries of War, Interior, and Agriculture and a small staff.

It was organized as an independent agency in 1930, with five full-time commissioners, and in 1935 was given administration of the Federal Power Act, of which the Water Power Act was made a part, with jurisdiction over the transmission and sale of electric energy in interstate commerce.

With the enactment of the Natural Gas Act of 1938, the commission entered a field which has become a major activity, the regulation of the interstate natural-gas pipe-line companies.

Although Congress undoubtedly intended to confine the jurisdiction of the Natural Gas Act to interstate operations, ambiguities in the wording of the law have from time to time raised the question of the commission's authority over producers' arm's-length sales of natural gas to interstate pipe lines. The commissioners have several times differed over this point among themselves but have never attempted to regulate the producers.

However, the question whether producers' sales are subject to regulation is now in the courts and eventually will be resolved by the Supreme Court in the case of the Phillips Petroleum Co., which the commission held was not subject to its jurisdiction as a natural-gas company because of its gas sales.

How it controls . . . Federal regulation of the natural-gas industry starts with the first step to translate plans into construction of new interstate pipe-line

EMULSION BREAKER TEST REPORT

Or How To Do a Better Treating Job with 84% Less Chemical

GIVEN below is as unbiased a field test of emulsion-breaker performance as it is believed possible to secure. All production factors (except the quantities of chemicals used, and first-test circulation and recycling) were kept uniform throughout. Each entry indicates one day's production; the tests following one another chronologically on normal production schedules.

These tests were made to determine the most efficient and economical emulsion-breaker treatment *for the producer.* Neither Visco nor any competitive manufacturer or service organization supervised the tests; and no changes in the respective emulsion-breaker formulas or dosages were made during the trial periods after initially-recommended dosages by field service representatives.

Dollar-wise, without consideration of time and labor savings, Visco cost was *$0.99 per 100 barrels less . . . over 6 times the amount of dry oil was produced per gallon of Visco . . . and no circulating or recycling was necessary with Visco.*

FIRST TEST RUN

TEST DAY	OIL PRODUCED BARRELS	GRAVITY	% B. S. & W.	AVERAGE CHEMICAL INJECTED	REMARKS
1	165.35	31.2	0.2	1 gallon	Tank Bottom Recycled
3	30.31			"	
4	331.22			"	
5	179.14			"	
6	176.96	31.3	0.3	"	Tank Bottom Recycled
7	181.92			"	
9	31.68	32.7	0.2	"	Tank Bottom Recycled
10		32.7	0.2	"	Tank Bottom Recycled
12	174.89			"	
13	77.19			"	
14	53.97			"	
18	11.71	33.7	0.1	"	Tank Bottom Recycled
19	379.60			"	
20	191.62			"	
22	86.71			"	
25	5.52	32.2	0.2	"	Tank Bottom Recycled
26	157.31			"	
28	187.72			"	
29	242.73			"	
32	77.83	31.6	0.3	"	Tank Bottom Recycled
33	76.25			"	
TOTAL	2819.63			21 gallons	

134.27 bbls. dry oil/gallon of chemical

SECOND TEST RUN WITH VISCO

TEST DAY	OIL PRODUCED BARRELS	GRAVITY	% B. S. & W.	AVG VISCO CHEMICAL INJECTED	REMARKS
34	273.70			0.692 qts.	
35	144.75			"	
36	89.58	31.8	0.2	"	
40	15.72	32.3	0.2	"	
41	38.77			"	
43	215.72			"	
44	132.33			"	
47	258.20			"	
48	136.43			"	
49	128.10			"	
50	66.12			"	NO RECYCLING OR
54	218.45	32.6	0.2	"	CIRCULATION
55	186.05	31.3	0.2	"	NECESSARY WITH
56	97.98			"	VISCO TREATMENT
57	212.19			"	
58	119.85			"	
59	4.13			"	
60	296.99	32.6	0.2	"	
61	194.81	32.4	0.2	"	
64	59.26			"	
65	299.09			"	
66	73.01	32.6	0.2	"	
70	110.74			"	
71	211.75			"	
72	126.78	31.7	0.3	"	
TOTAL	3710.50			4.325 gallons	

857.91 bbls. dry oil/gallon of Visco

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facilities. Before any move toward construction can begin, a certificate of public convenience and necessity must be secured and the commission is required to hold a hearing before it issues it.

When a pipe-line company files its application, whether for expansion of its system capacity or for service in an entirely new market area, the commission takes a searching look at all aspects of the project.

First it examines the gas supplies available to the applicant, particularly where new territories are to be served, to insure that customers will have certain service over a long period. Usually the commission requires that substantially full deliverability to meet estimated market needs must be shown to be available for about 20 years.

In addition to proving an adequate gas supply, the applicant must make a showing of the physical adequacy and economic feasibility of the system, that it can finance the project on the basis which will result in reasonable charges, and that it has an assured market for the volumes of gas it proposes to transport.

Even after the pipe line is constructed and put into operation commission control continues. Its rates and costs are subject to continuous review, its bookkeeping methods are prescribed, and approval must be secured for every change in the physical character of the line other than normal maintenance and replacement.

One of the newer features of the natural-gas industry in which the commission is particularly interested is the underground storage of gas during the summer for release during the winter months of peak demand. The commission is eager to encourage this development because it affords a means of serving increased essential peak-period demands without the building of additional long pipe lines from producing fields to consuming areas. It also has a conservation advantage in permitting the companies to operate their systems at relatively high load factors without resort to uneconomic dump sales during the nonheating months.

The organization . . . All decisions involving construction, rates, etc., are made by the commissioners as a body, but the detailed work on which they base their findings is handled through these divisions, as follows:

. . . Division of Gas Certificates, Carl T. Kalina, chief, receives and analyzes applications for certificates, submitting its reports to the commission, and assists FPC attorneys in the subsequent hearings.

. . . Division of Rates, Edgar S. Coffman, chief, studies and investigates rate matters and prepares exhibits and presents expert testimony in formal proceedings relating to system operations, service lines, gas reserves, depletion rates, costs of service, etc. A gas-rate investigation section, Frank S. French, chief, is responsible for the engineering and geological phases of formal rate investigations involving the natural-gas companies.

. . . Bureau of Accounts, Finance, and Statistics, Charles W. Smith, chief, establishes the accounting system to be used by natural-gas companies and makes investigations for rate purposes upon complaint of state regulatory and other authorities or at the direction of the commission.

The bureau has a Division of Original Cost which makes field examinations of reclassification and original-cost studies filed by public utilities to classify plant accounts on a uniform basis and segregate the excess over original cost representing writeup, intangibles, and improper charges for appropriate disposition.

Another section is the Division of Finance and Statistics which handles assignments relating to the financial aspects of certificate matters and which compiles and publishes statistical information respecting the natural-gas industry.

. . . Bureau of Law, Willard W. Gatchell, chief, handles the legal phases of the commission's work, and includes a natural-gas division under William J. Grove which deals with legal points arising in connection with certificate proceedings, rate cases, and other matters.

It also has a Division of Interpretation and Research, Frederic Pearse, acting chief, which deals with the interpretation of the commission's jurisdictional statutes and executives orders and conducts research in connection with difficult and disputed questions of law.

. . . Division of Examiners, Edward B. Morris, chief, conducts commission hearings, submitting reports to the commission analyzing the evidence and questions and issues involved, making independent findings of basic and ultimate fact, stating conclusions and making initial decisions for commission consideration.

Politics and personnel . . . Because three of the five commissioners may be members of the same political party the majority of the commission normally reflects the policies of the party in power, although neither Presidents Roosevelt nor Truman was always able to keep it in line.

Currently, however, the commission is composed of two Republicans, two Democrats and one Independent. Members are Jerome K. Kuykendall of Washington, chairman, and Claude L. Draper of Wyoming, vice chairman, Republicans; Dale E. Doty of California and Seaborn L. Digby of Louisiana, Democrats, and Nelson Lee Smith of New Hampshire, Independent.

Housed for many years in its own building at Eighteenth Street and Pennsylvania Avenue, the commission recently moved into new quarters in the General Accounting Office Building at Fifth and G Streets, N.W., Washington.

Old Methods Revived

Interconnection of producing zones, reduction of reservoir pressure below bubble point favored for better recovery

Henry D. Ralph

THE oil industry seems to be going around a cycle in its attitude toward conservation practices and engineering control of reservoirs to achieve maximum ultimate recovery.

At least on two aspects of the subject many reservoir engineers currently favor practices which were common in the industry some 20 years ago but which since have been condemned as wasteful and ruinous.

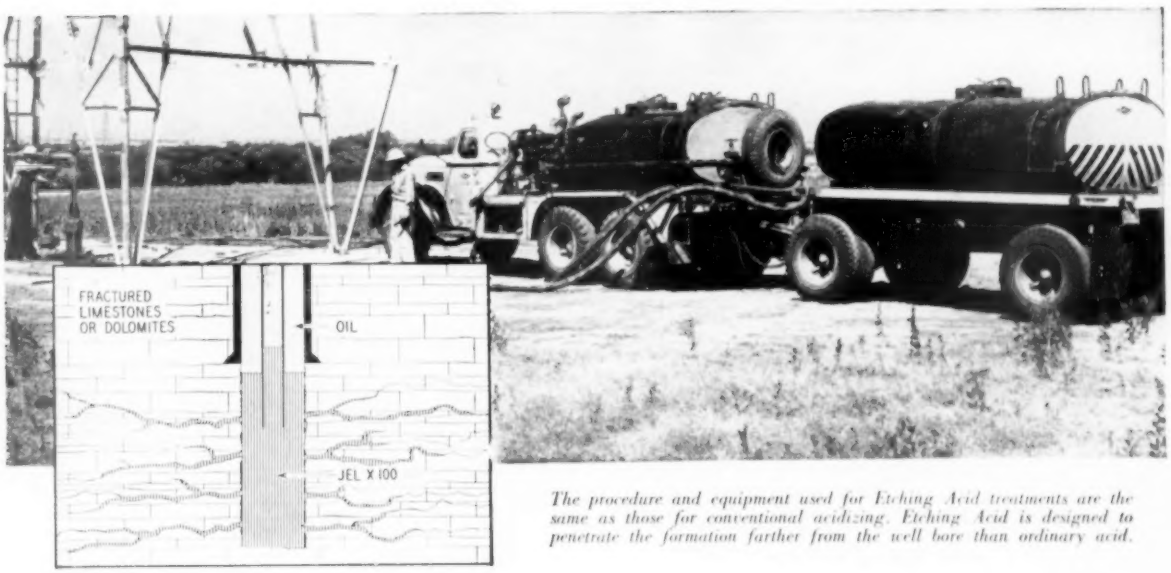
One is the tenet that several zones at different depths should always be produced separately and never allowed to become interconnected. There is now evidence that in many fields it is not only permissible but highly beneficial to interconnect all zones by open holes and to produce them all at once.

The second practice now coming under suspicion is the principle that reservoir pressure should never be reduced below the bubble point at which dissolved gas will separate from the oil. Experience tends to show that often there will be greater ultimate recovery of oil by deliberately causing the formation of free gas in the reservoir.

Neither of these new concepts is as yet definitely accepted by state regulatory bodies nor by all reservoir engineers, but the extent that they are receiving endorsement illustrates how conservation theories change and suggest that perhaps other accepted ideas

ETCHING ACID GAVE RESULTS WHERE REGULAR ACID FAILED

Etching Acid increased production 25 BOPD after ordinary acid treatment failed to boost output



The procedure and equipment used for Etching Acid treatments are the same as those for conventional acidizing. Etching Acid is designed to penetrate the formation farther from the well bore than ordinary acid.

Here's the case history of an oil well that was completed in a limestone formation. It failed to respond to a conventional acidizing treatment, so Dowell was called in for consultation on the job. Dowell engineers analyzed the well and recommended an Etching Acid treatment. This suggestion was followed and production was increased from 8 to 33 BOPD.

Etching Acid treatments, using Jel X 100, are primarily suited for use in limestone or dolomitic formations with either fractured or vugular porosity. Etching Acid is designed to etch fractures or "vugs" . . . to clean fractures by removing calcite, mud, silicate and feldspar materials . . . to penetrate formations far from the well bore before the acid becomes spent. No auxiliary jel-breaker solution is required following Etching Acid.

If you would like to know more about Etching Acid or any of the many other Dowell oil field services, contact the nearest Dowell office. Or, if you prefer, write directly to Tulsa, Dept. H-11.

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FOR OIL INDUSTRY CHEMICAL SERVICE

of oil production may be altered after new laboratory research and field experiments.

Commingling of zones . . . The practice of commingling production from different zones was approved last May by the Oklahoma Corporation Commission for the Southeast Doyle pool in Stephens County, Oklahoma, on application of Phillips Petroleum Co. Such commingling has been permitted for salvaging old fields, but so far as is known this is the first time that any regulatory body has permitted it in a relatively new field.

In Southeast Doyle there are six sand zones in the Springer shale lying from 6,000 to 8,000 ft. deep. All have about the same virgin pressure, allowing for depth gradients. All produce crude of about the same gravity, and all have about the same gas-oil ratio.

Following standard practice, the commission required operators to produce from each sand separately, and where a well penetrated more than one zone the nonproducing zones were required to be blocked off so there could be no communication of fluid or pressure between them and the producing zone.

Each well had an allowable of 150 bbl. per day, but all the zones are undersaturated and the wells had a short flowing life.

Last spring, Samadan Oil Co. filed an application for a dual completion in Southeast Doyle, and asked an allowable of 250 bbl. per well regardless of the number of producing sands. Phillips countered with a proposal for commingling of production from all zones without the need for keeping the zones separate. This was approved by the commission.

It was demonstrated to the satisfaction of the commission that no damage would be done to the reservoir by permitting the six zones to be interconnected by open wells because all zones are so nearly alike in characteristics that there would be no harmful migration of fluids or pressure, and the recoverable oil from all zones would ultimately drain into the well bores.

By permitting all zones to drain into the wells, pumping costs will be greatly reduced as compared with dual completions where the zones are kept separated and double pumps used. As the field's production drops to the point where each zone yields only a few barrels per day per well, the contributions of all of them will make it economic to continue to pump the wells, whereas no single zone would yield enough to make a well pay operating costs.

By preventing premature abandonment, this commingling practice is expected to result in considerably greater ultimate recover of oil from this field.

Engineers point out that by no means all multiple-zone fields can be treated in this manner. Where pressures and other characteristics vary importantly, the zones must be produced individually. However, it is believed that a considerable number of fields in the United States have several zones of such nearly identical characteristics that commingling would be not only practical but also yield more oil at lower cost over the life of the field.

Bubble-point theory . . . The new approach to the bubble-point theory was first made by C. R. Holmgren and R. A. Morse of Stanolind Oil & Gas Co. in a paper on "Effect of Free Gas Saturation in Oil Recovery by Water Flooding," delivered before the 1950 fall meeting of the American Institute of Mining and Metallurgical Engineers at New Orleans. While the experiments behind this paper were concerned primarily with secondary recovery, the principles developed are said to be equally applicable to primary recovery in an unsaturated water-drive reservoir.

Until this paper was published it had been the accepted doctrine that a field should be produced at a rate slow enough to keep the reservoir pressure from dropping below the bubble point in order to keep the gas from coming out of solution with the oil. It was known that the viscosity of the crude oil increases as gas comes out of solution, and it was the theory that if the pressure dropped below the bubble point the oil would stick to the sand grains and become unrecoverable.

The new theory, pointed to by the Stanolind water-flood research, is that viscosity of the crude drops as gas is released until the bubble point is reached but then rises again as the pressure is lowered.

The explanation is that when gas comes out of solution it forms tiny bubbles which displace similar-sized droplets of crude oil. These gas bubbles become lodged in the interstices of the reservoir sand, crowding out oil which otherwise would lodge there.

A water sweep, whether a natural drive or injected, will not flush out all material between the sand grains, and the new theory is that if the gas is freed from solution ahead of the water front, bubbles of gas will remain entrapped by the water instead of drops of oil.

The Stanolind experiments indicate that the production of oil can be substantially increased by maintenance of free gas saturation in the reservoir. This effect is accomplished by the alteration of oil relative permeability characteristics and the occupation by gas of the pore space that would otherwise be filled with residual oil.

A number of reservoir engineers for various oil companies have been expounding this new theory before the regulatory bodies of several states in an attempt to get permission for faster rates of production in fields where these conditions exist. Their argument is that by lowering the pressure below the bubble point they can obtain the bulk of the oil ahead of the advancing water front and that the water will then flush out the remaining free oil.

What remains entrapped between the sand grains will then be chiefly bubbles of gas, which is less valuable than the same volume of oil. In this way, it is argued, there will be greater ultimate recovery of oil than would be obtained by adhering to the established practice of maintaining reservoir pressure above the bubble point.

So far as is known, however, no state regulatory body has yet been convinced that the old theory is wrong and that reservoir pressure may safely be reduced as rapidly as the new theory suggests.

N.P.A. Meeting Set

Safety, corrosion panels to highlight annual meeting

ATLANTIC CITY.—Panel discussions on safety problems and rust preventives and corrosion control will feature the fifty-first annual meeting of the National Petroleum Association here September 16-18.

The safety symposium is scheduled for the morning of September 16, opening day of the meeting, and the corrosion control discussion is slated for the afternoon of the following day. Featured speakers at the general sessions of the meeting will include Lt. Gen. James H. Doolittle, vice president of Shell Oil Co.; Paul Wooton, Washington correspondent; and Stephen F. Dunn, general counsel for the Department of Commerce.

Subjects to be considered by the safety panel and speakers for each will include: "Restrictive Ordinances," J. Howard Myers, Atlantic Refining Co., safety director; "Refinery Safety," Frank J. Sluze, Ashland Oil & Refining Co., safety supervisor, and "Fire Protection," H. Archer Ashton, safety supervisor at Paulsboro refinery of Socony-Vacuum Oil Co., Inc.

Scheduled for the corrosion control symposium will be the following papers:

"Corrosion Inhibitor Applications in the Petroleum Industry," prepared jointly by F. M. Watkins and R. I.

SECTIONS OF 26-INCH PIPE ARE JOINED TOGETHER NEAR OWENSBORO, KENTUCKY, AS H. C. PRICE CO. COMPLETES 363-MILE LOOPING PROJECT FOR THE TEXAS GAS TRANSMISSION CORPORATION.

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"Rust Prevention in the Transportation of Petroleum Products," W. S. Quimby, The Texas Co.; "The Use and Testing of Rust Inhibitors for Flat Rolled Steel," C. P. Larrabee and Dr. R. B. Hoxeng and presented by Dr. Hoxeng, United States Steel Corp.; "Laboratory Performance Testing of Petroleum Base Rust Preventives," H. A. Ambrose and E. S. Francis, Gulf Research & Development Co., and E. E. Fisher, Gulf Refining Technology Laboratory; and "Factors to Be Considered in an Evaluation of Corrosion and Corrosion Inhibitors," Dr. E. J. Schwoegler, Armour Research Foundation of Illinois Institute of Technology.

Comments on the papers presented will be made by Dr. E. B. Bray, president of Bray Oil Co.

Leasing Policy Changed

LANSING, Mich. — The Michigan Conservation Commission abolished this month its "checkerboard" leasing policy covering state-owned lands, and has opened the way for 100,000 acres in active areas to be leased at public auction for oil and gas development.

Under the old policy, the state withheld from leasing one-eighth of all state-owned lands until adjacent land had been proven productive. A review of this policy over a 12-year period showed that the loss of rental payments from the withheld lands more than offset expected higher bonuses and royalty rates from proven areas.

New Alaskan Seeps Found

WASHINGTON.—Large additional areas of Alaska may be developed into new oil provinces as a result of the discovery by Geological Survey field parties of oil seepages in the uninhabited Malaspina Glacier area.

Discovery of several active seepages of high-gravity oil on two streams that drain into a large ice-dammed lake on the south flank of the Samovar Hills was reported by Survey geologists Darwin L. Rossman and George Plafker in July. These hills, located about 30 miles from the Gulf of Alaska coast, midway between Icy Bay and Yakutat Bay in southern Alaska, are surrounded by snow and ice fields of the Malaspina, Seward, and Agassiz glaciers.

The USGS identified the Samovar Hills as lying in the north-central part of a 300-mile belt of Tertiary sedimentary rocks that borders the Gulf of Alaska on the northeast. Seepages of high-gravity paraffin-base oil have long been known in the northwestern or Katalla-Yakataga portion of the belt where Phillips Petroleum Co. and Kerr-McGee Oil Industries, Inc., jointly are carrying out exploration on a large block of leases. The new seepages are 45 miles to the northeast.

The Samovar oil seepages are located in rocks of Tertiary age, in a shattered zone near the contact between a marine siltstone unit and an overyling, yellow-weathering, predominantly sandy, coal-bearing unit, the USGS explained.

GULF COAST

TYPICAL OPERATION off the Louisiana coast is this barge-mounted rig. (Shell photo).

Gulf Activity Picks Up

Operators seek more drilling, seismic survey permits in past two weeks than in any single month this year

William P. Sterne

HOUSTON. — Drilling and seismic activity in waters off the Louisiana and Texas coasts—and inland waters of the Louisiana delta region—is increasing steadily.

During the past 15 days, 11 oil and gas operators have announced plans to drill at least 14 new development wells from drilling barges in these areas.

This activity, coupled with that already under way *(The Oil and Gas Journal, July 20, page 68)* will assure continued efforts by operators to develop further the promising oil and gas fields of these inshore and offshore regions.

In addition to the drilling programs, another group of operators is seeking permission to carry out renewed seismograph-mapping surveys of various Louisiana coastal and inland-water areas, and off the Texas coast.

Work picking up . . . The New Orleans district office of the Corps of Engineers reports that a total of 22 applications have been filed within the past 90 days by operators seeking permits to drill oil and gas wells in navigable waters. Also there have been 35 requests filed for permission to conduct seismograph operations, and 30 requests to lay oil or gas-gathering lines under navigable waters in the coastal regions. In fact, there has been more activity during the first 15 days of August than for any single month this year.

The Galveston office of the Engineers Corps also reports a step-up in activity, with increasing numbers of permits filed for offshore drilling and the laying of underwater pipe lines, especially in the Corpus Christi Bay area.

Drilling . . . Following is a brief outline of locations listed by 11 operators who

DEVELOPMENT WELLS planned by Gulf Coast operators are shown above on this map of the Louisiana Delta area.

seek permission to drill development wells:

... **The Texas Co.,** three offshore wells in Louisiana, one in Main Pass, Plaquemines Parish, about 7½ miles northeast of Pilottown *(see map);* one in Octave Pass, 5 miles northeast of Pilottown; and one in Chandeleur Sound, about 40 miles south of Bay St. Louis, Miss.

.... **Shell Oil Co.,** in Atchafalaya Bay, about 20½ miles southwest of Morgan City, in Terrebonne Parish, Louisiana, and also in Bay aux Chenes, 11½ miles southeast of Delacroix, in Plaquemines Parish, Louisiana.

... **Monterey Exploration Co.,** in Lake Verret, in Assumption Parish, Louisiana.

... **O'Meara Brothers** of Houston, in Lake Fortuna, in Assumption Parish, Louisiana.

... **Continental Oil Co.,** in West Bay, about 3½ miles northeast of Burrwood, La., in Plaquemines Parish.

... **Seaboard Oil Co.,** in Bay des Illetes, 10½ miles northeast of Leeville, in Lafourche Parish, Louisiana.

... **Stanolind Oil & Gas Co.,** in Calcasieu Lake, about 5½ miles northwest of Cameron, in Cameron Parish, Louisiana.

... **H. L. Hunt,** Dallas, in Lavaca Bay, about 2 miles northeast of Port Lavaca, Tex.

... **Lamar Hunt Trust Estate,** in San Antonio Bay, about 11 miles southeast of Austwell, in Refugio County, Texas.

... **Gulf Oil Corp.,** in Corpus Christi Bay, about 12 miles south of Aransas Pass, Tex.

... **C. G. Glasscock,** Corpus Christi, in Copano Bay, about 10 miles north of Rockport, Tex.

Seismograph work ... Ten companies ask permission for seismograph-mapping programs in the following areas:

... **Pure Oil Co.,** in the Gulf of Mexico in a general area 60 miles wide and 135 miles long in St. Bernard, Plaquemines, Jefferson, Lafourche, and Terrebonne parishes.

... **Cities Service Oil Co.,** in Blind, Redfish, and Garden Island bays; North, Loutre, and Southeast passes about 18 by 10½ miles, 20 miles southeast of Venice, La., in Plaquemines Parish.

... **Stanolind Oil & Gas Co.,** a 24 by 24-mile area around a point about 15 miles southeast from Pointe-a-la-Hache, in Plaquemines and St. Bernard parishes, also offshore in Pontchartrain, St. Catherine, Borgne, and Little lakes; Chef Menteur, Unknown, and Rigolets passes in a 24 by 23½-mile area about 18 miles north from Shell Beach, in St. Tammany, Orleans, and St. Bernard parishes.

... **Gulf Refining Co.,** in Caillou Bay, to a point 24 miles southwest from Dulac, La., in Terrebonne Parish.

... **The Texas Co.** will cover inshore areas along the Gulf of Mexico, about 25 by 15 miles in extent, about 4½ miles southwest of Buras, La., in Plaquemines Parish.

... **Marine Exploration Co.,** a 2½ by 2½-mile area, at a point about 18 miles southwest of White Castle, La., in St. Martin Parish, in Flat Lake, Bee Bayou, and other connecting waterways.

... **Union Oil Co. of California** plans to cover a 60 by 26-mile area extending a central point about 17 miles southwest of Franklin, La., in Vermilion, Iberia, St. Mary, and Terrebonne parishes.

... **Natural Gas & Oil Corp.,** 8.6 by 8-mile area, 11 miles southwest of Lafitte, La., in Jefferson and Lafourche parishes.

... **British-American Oil Producing Co.,** in the Gulf of Mexico, 21 miles wide on the west and 6 miles wide on the east, extending from a point near Calcasieu Pass, La., east 66 miles to near Chenier au Tigre.

PLANNED development wells in the Corpus Christi area are shown above.

... **Brazos Oil & Gas Co.,** Houston, in Matagorda Bay, 8 miles northeast of Port O'Connor.

New Depth Record Possible

FRANKLIN, La.—Shell Oil Co.'s 2 Gonsoulin-Minville State Unit, deepest test ever drilled in Weeks Island field of Iberia Parish, coastal Louisiana, was being watched closely last week, with the possibility looming that it might become the world's deepest oil producer.

On August 18 the well was reported at a total depth of 17,858 ft., and electric log was being run. The test passed the 17,404-ft. mark on August 1, breaking a previous depth record for the area set by Humble Oil & Refining Co.

Shell already has the world's deepest commercial producer at Weeks Island, with 1 Weeks Gall Unit. This test was completed last March through perforations from 17,039-17,122 ft. in the Miocene *(The Oil and Gas Journal, March 30, page 56).*

Iran Changes Leaders

If the new regime can stay in power, the revolt could mean an ultimate solution of the nation's oil problems

THE establishment of a new government in Iran last week opened new possibilities for eventual settlement of the long-deadlocked oil nationalization problem.

The Shah, whose supporters ousted Prime Minister Mossadegh and his government in an unexpected and bloody uprising, is known to be a moderate. He has shown no sympathy with Dr. Mossadegh's bitter and uncompromising attitude toward an agreement with Britain.

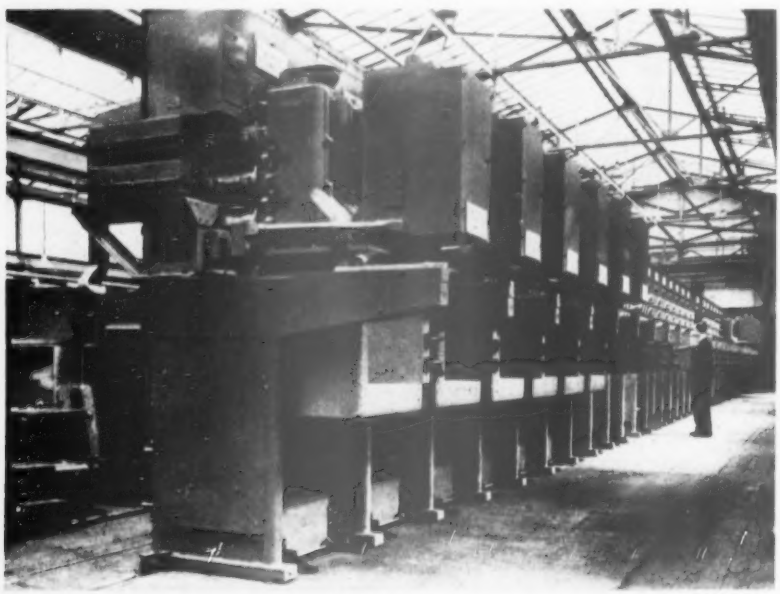
However, Iranian politics are so subject to overnight changes that no one could be sure of the likely outcome of the revolt. Any hope for an oil settlement rests on the assumption that the new regime can stay in power against the powerful Communist opposition and the still numerous Mossadegh followers.

While the new prime minister, Gen. Fazollah Zahedi, is a firm supporter of the Shah, he served as minister of Interior in the 1951 cabinet under which the oil nationalization took place and is considered to be only slightly less nationalistic than Dr. Mossadegh.

Last week's revolt was a struggle for power between the two dominant political factions, rather than a contest over the oil issue itself. Any settlement which might come hereafter will be a byproduct of the changed political picture. In fact, the eight reforms promised by General Zahedi in his victory broadcast made no mention of the oil questions.

Iran's oil industry, which is based on some 15 billion barrels of reserves, has been almost completely idle since the staff of Anglo-Iranian Oil Co., Ltd., was forced to halt operations and was subsequently expelled from the country 2 years ago.

There is little expectation that Anglo-Iranian could reenter the country even under the most favorable settlement. Britain has been firm in its demand for adequate compensation for the company under an arrangement whereby production would be marketed by a new international oil group.



Cardon Refinery Getting New Mammoth Control

This 103-ft., 28-panel, switchboard was shipped to Venezuela in July from Britain where it was manufactured for the Shell organization's Cardon refinery. It comprises Reyolle type BST switch gear, with rupturing capacity of 500 m.v.a. at 6.6 kv. Associated with the new equipment is a 32-panel control board with necessary protective relays, recording and indicating instruments. Costing the equivalent of about $325,000, the equipment will replace the refinery's present 250 m.v.a. switchgear. It provides for a planned increase in the present power plant capacity of 30,000 kw. Construction is under way at Cardon on a new switchhouse which will have fireproof doors and CO_2 fire-extinguishing equipment.

Tanker Pace Slows

Shipping slump credited with first postwar drop

A SLOWDOWN in the pace of new tanker construction is indicated in latest figures on the world total of tonnage under construction or contracted.

New tanker tonnage has shown its first decline since the end of World War II, according to Lloyds of London. As of July 1, the total on order was 13,343,350 tons deadweight, a drop of 1,198,750 tons when compared to last January 1. The preceding half year showed a rise of 849,930 tons.

Of the total drop in tonnage building or contracted, the United Kingdom's share was 400,000 tons. Total orders on hand at British yards as of July 1 amounted to 4,800,000 tons. Swedish orders showed a drop of 200,000 tons, the United States 250,000 tons, and Germany 67,500 tons. Japan suffered the highest proportional decline with orders for only 124,500 tons against 385,200 tons 6 months earlier.

The fact that the tanker market has been in a slump for more than a year has undoubtedly caused many operators to hesitate before placing orders for more new vessels. A tremendous tanker construction program has been taking place since the end of the war, particularly in foreign yards. Much of this has been in supersized vessels with double or more the carrying capacity of the wartime T-2s.

Lloyds' information showed that the world tanker fleet was expanded by 1,700,000 tons during the first half of 1953, compared with 1,600,000 tons during the previous 6 months. Total world tanker tonnage of all kinds stood at 34,500,000 tons July 1. Britain's tonnage total of 7,585,893, representing 22 per cent of the total, was the highest. The United States, excluding government-owned tankers, had 7,151,300 tons, or 20.7 per cent, and Norway, 5,237,344 tons, or 15.2 per cent.

Catalyst Plant Planned

Construction of a new plant to manufacture Platforming catalyst will get under way soon in England.

David W. Harris, president of Universal Oil Products Co., disclosed plans

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for the new plant with an announcement that U.O.P. has formed a manufacturing subsidiary in conjunction with John Matthey & Co., Ltd., platinum refiners in London.

Harris said Procon, Ltd., will build the new plant and it is expected to go into production by mid-1954.

The first catalyst manufactured by the new plant will go to Anglo-Iranian Oil Co., Ltd., and Shell Refining & Marketing Co., Ltd., for use in refineries in the United Kingdom and abroad.

C. D. Sims of U.O.P. has been named general manager of the new firm, Universal-Matthey & Co., Ltd. L. C. Montague, a managing director of Johnson, Matthey & Co., has been named chairman, and P. D. F. Varrall, secretary of the London platinum refiners, will be secretary of the new company.

Austrian Crude Estimate Up

A new and higher estimate of crude-oil production in the Soviet Zone of Austria has been made by the Austrian Institute for Economic Research.

A report by this group in Vienna said that the Soviet occupation administration last year took 4,000,000 tons (74,500 bbl. daily) from Austria's oil fields, all of which lie in the Russian Zone.

It is known that Austrian production has been greatly expanded since 1949-51 when three new major fields were discovered by the Russians. Since no figures are announced, estimates of output was only 550,000 tons or about 11,000 bbl. daily.

The estimate of the Austrian Institute for Economic Research is considerably above the 2,800,000 tons (52,000 bbl. daily) reported earlier by the Trade Association of the Austrian Mineral Oil Industry *(The Oil and Gas Journal, July 27, page 218).*

The Economic Research Institute pointed out that in 1937 Austria produced only 30,000 tons, or about 60 bbl. daily. In that year, Austria imported 350,000 tons of products. In 1952, the Soviet administration released 1,172,000 tons, about 25,000 bbl. daily, in products for the domestic market, and only 25,000 tons of specialty products had to be imported.

Slav Wildcat is Producer

Discovery of commercial oil production has been reported in a wildcat well at Jermenovica in the Banat Province of Yugoslavia.

The well tested initially between 140 and about 200 bbl. daily and is now shut in awaiting completion of transportation facilities. The government organization has another well drilling about 7 miles from the discovery and tests are under way in other parts of the area, geologically a part of the Hungarian basin.

The nearest producing field to the discovery is at Velika Greda, southeast of Belgrade. Official Yugoslav sources said that the importance of the discovery lies in the fact that for the first time reserves believed to exist in the northeastern part of the country may now be economically developed.

Cubans to Drill Deep

Idle government rig turned over to independent group

THE Cuban Development Commission has just announced its decision to turn over the government-purchased National 75 rig to a group of independents working as Cia. Cabaiguan, S.A., and Cia. Petroleo Jarahueca, S.A.

Climaxing negotiations which have kept the rig idle since its purchase about 2 years ago, the present step apparently assures the first independent deep drilling in Cuba. Drilling should start soon, probably near the boundary line separating Santa Clara and Camaguey provinces.

Thus far only majors have drilled deep in Cuba. There has been no activity by the big companies since Gulf spudded in its Blanquizal III test off the north coast in April, 1951, and went to 11,218 ft.

Imminent activity by independents has caused a great deal of local interest. Trans-Cuba Oil Co., another independent group backed by Cubans with business interests in other fields, has succeeded in raising $750,000 to match $750,000 reported available in the United States.

Tied in to the government action on the National 75 is the plan of the Cuban Development Bank to help the Cabaiguan refinery boost its daily capacity to 1,000 bbl. daily. Long shut down, the independent refinery was recently reopened and is now handling about 200 bbl. daily. Equipment is already on order and some has arrived in Cuba.

Catalyst Plant Completed

A new plant for the manufacture of microspheroidal aluminum catalyst has been completed in Amsterdam in the Netherlands to serve Europe's greatly expanded refining industry.

The plant was built at the Royal Sulfuric Acid Works which is manufacturing the catalyst under license from American Cyanamid Co., New York. American Cyanamid supplied technical assistance for the project. Construction was begun late in 1951, and the first catalyst produced was nearly 10 months ahead of schedule.

Pakistan Stock Buyers Shy

Pakistan nationals have applied for little more than a third of the 30,000 shares of Pakistan Oilfields, Ltd., offered to the public under the nation's oil law.

The parent Attock Oil Co., Ltd., said in its annual report that the matter has been reported to the government. Directions for future action in line with the country's industrial policy are now being awaited.

During the last few years several local companies have made minority stock offerings to the public in the country of operation. Some governments require this. Many industry officials believe it is healthy to have a local financial participation in exploration ventures.

The 30,000 shares of Rs 10 each (about $3) which were offered to Pakistan nationals represented 30 per cent of the issue capital of Pakistan Oilfields. Only 11,468 were applied for during the offering.

Beach Pollution Attacked

Britain is taking steps to minimize pollution of her beaches by oil residue discharged from seagoing tankers.

A Ministry of Transport committee has recommended that deep-sea tankers proceeding to foreign destinations be compelled to use waste-oil facilities in United Kingdom ports, if such facilities exist. Tankers proceeding to a British or near Continental port should discharge oily residues at the port of arrival. If no port waste-oil facilities exist, the residue should be discharged at sea at least 100 miles from the United Kingdom.

The committee pointed out that beach pollution is causing growing concern, not only in Britain, but in other European countries, particularly France, the Netherlands, Western Germany, Denmark and Ireland. The committee urged the British Government to seek an agreement with other maritime countries to control oil discharge at sea.

The recommendations made by the committee are regarded as temporary measures for Britain herself. It will probably take some years to complete any international agreement to solve the problem.

Heads Chemical Firm

McCurdy started career as Ventura field roustabout

THE new president of Shell Chemical Corp., Richard Clark McCurdy, is a former oil field roustabout who now makes astronomy, electronics, and sailing his major hobbies.

Born at Newton, Iowa, in 1909 he spent his youth at Pasadena, Calif., and received his A.B. and Engineering Mines degrees from Stanford University. At Stanford, he was on the swimming and water-polo teams and a member of Beta Theta Pi fraternity.

McCurdy began his career in the petroleum industry as a roustabout in Shell Oil Co.'s Ventura, Calif., field in 1933. During the next 2 years he worked as a rotary helper, gager, repairman and well puller before his appointment as a junior engineer. He then advanced through increasingly responsible positions as an engineer, serving at Los Angeles, Bakersfield, Coalinga, and Long Beach. In 1942 he was transferred to Shell's Washington office on special assignment, and the following year became chief exploitation engineer at Los Angeles. In February 1945 McCurdy was named acting division manager of the San Joaquin production division with headquarters in Bakersfield.

Worked abroad . . . At the beginning of 1947, he moved to Maracaibo, Venezuela, as assistant manager of the western division, and later as manager, for the Royal Dutch-Shell Group companies in Venezuela. From November 1950 until May 1953 he was general manager of these companies in Venezuela, with headquarters in Caracas.

When he became president of Shell Chemical Corp. this spring, McCurdy took over the reins of an organization which since its establishment in 1929 had achieved a widespread reputation as a pioneer in the petrochemical field. Early specialization in anhydrous ammonia fertilizer and industrial solvents was followed by a postwar expansion which included the first commercial production of synthetic glycerin. For this the Shell companies in 1948 received the Achievement Award of Chemical Engineering.

In agriculture, too . . . The company achieved new importance in the field of agriculture last year when it bought the stock of Julius Hyman & Co. and became the exclusive manufacturers and distributors of aldrin and dieldrin, the powerful new insecticides. Another important new product promoted by Shell Chemical is EPON, the epoxy resin now making revolutionary advances in the fields of coatings and adhesives.

Shell Chemical has manufacturing facilities in California, Texas, and Colorado, as well as an application laboratory in New Jersey. It manufactures about 40 products and distributes them throughout the United States. The company employs 4,000 men and women.

McCurdy was married in 1933 to Harriet Sutton, a fellow student at Stanford. They have four children, three boys and one girl.

They live in Connecticut, where McCurdy in his spare moments is able to follow his interest in sailing and golf and in building high-fidelity phonograph equipment.

He is a member of the American Institute of Mining and Metallurgical Engineers and the American Physical Society.

W. D. Lane, superintendent for Plymouth Oil Co. in Midland, Tex., has been elected president of the Permian Basin Oil Show for 1954. Lane, formerly vice president of the show, succeeds **Lloyd French** as president. **Roy Carter** of Kermit has been elevated from treasurer to first vice president. **Joe T. Dickerson,** vice president of Shell Oil Co. in Midland, has been elected second vice president of the show. **Charles E. Foster,** Odessa, has been named to replace Carter as treasurer. **Carlos Clover** will continue as secretary and general manager.

Ellis Hall, 54, Albuquerque, N. M., president of Round Top Oil Co. and Condor Petroleum Co., and his family have been objects of an intensive plane search. His private plant disappeared on a flight from Juneau to Bellingham, Wash., August 17. He was accompanied by his wife, two daughters, and another passenger. Hall is a director of the Independent Petroleum Association of America.

Harold D. Hansen has been appointed petroleum engineer for the Colorado-Nebraska field of British-American Oil Producing Co.'s northwestern district. He joined British-American last June after nearly 7 years in Peru and Colombia with International Petroleum Co., Ltd.

George L. Noble, Jr., has been named president of Stanwell Oil & Gas, Ltd., Canadian independent company. Since May 1951 he has headed the Small Business Office of U. S. Army Ordnance. Noble was formerly vice president and general manager of Greta Oil Co. and later served as vice president and general manager of Western Gulf Products Co. from 1939 to 1941. From 1942 to 1946 he was regional director of the War Production Board for Oklahoma, Louisiana, and Texas.

Earl W. Unruh has been elected a vice president and director of Pioneer Pipe Line Co. He recently was named part-interest executive of Sinclair Pipe Line Co., which owns 35 per cent of the Pioneer system.

H. W. Manley has resigned as vice president of Sunray Oil Corp. in charge of the refining and natural-gasoline departments to become an independent operator. Manley joined the old Barnsdall Oil Co. in 1935. Barnsdall later was merged with Sunray.

E. C. Doell, southern district exploration superintendent for Standard Oil Co. of California, has been assigned to the staff of the chief geologist of the company in San Francisco. Other new appointees include: **Antonie Paap,** formerly district geological supervisor in Oildale, Calif., assigned to the chief geologist's staff in San Francisco; **H. C. Bemis,** chief geophysicist,

PERSONALS

Wyoming Geologists Participate in Field Conference

Geologists taking leading roles in the recent eighth annual field conference of the Wyoming Geological Association, were, left to right: H. R. Van Gilder, Sohio Petroleum Co., coeditor of guidebook; D. L. Blackstone, University of Wyoming, guidebook editor; S. H. Knight, University of Wyoming, general chairman; D. L. Hansen, The California Co., caravan leader; H. D. Thomas, University of Wyoming, general chairman; T. C. Wilson, Gulf Oil Corp., advertising; and Fred H. Carr, British-American Oil Producing Co., association president. The conference, based at the University of Wyoming in Laramie, included two 1-day trips in Laramie basin, a 1-day trip into the North Park basin of Colorado, and three evening meetings.

named exploration superintendent for the southern district; and **E. G. Dobrick, Jr.,** formerly division superintendent of the eastern exploration division of The California Co., a Standard subsidiary, named chief geophysicist in Oildale.

J. R. Lane, Jr., superintendent of Dow Chemical Co.'s glycol plant No. 3 at Freeport, Tex., has taken up a new assignment in the company's technical-service and development department at Midland, Mich. Other Texas changes include: **A. V. Baker,** Freeport, promoted from technician to instrument engineer at Plant A; **H. C. Bellinger,** Lake Jackson, advanced from estimator to engineering-group leader, engineering department; **G. W. Hannah,** Freeport, control operator in the ammonia plant, moved to the maintenance department as an inspector; **J. N. Lipscomb,** Velasco, Tex., named an assistant chemist in the central laboratory; **C. E. Morgan, Jr.,** Freeport, promoted from administrative assistant to assistant to the chief engineer; **S. P. Smock,** Lake Jackson, Tex., advanced from assistant chemist to chemist in the ethylene glycol department; and **D. L. Spell,** Lake Jackson, promoted from laboratory assistant to chemist in the central laboratory.

Dr. Gustav Egloff, director of research for Universal Oil Products Co., has been elected an honorary fellow of the Royal Society of Edinburgh. He is one of four non-British subjects who have been so honored this year.

Russell G. Johnson has been promoted to chief engineer and **Glenn A. Harding** has been promoted to assistant chief engineer of Bechtel Corp. Johnson, who has been with the firm 11 years, formerly was chief engineer on special projects. Harding has been with the company since 1940.

John H. Pittman, civil engineer in the Anahuac district of the Gulf Coast division of Humble Oil & Refining Co., has been transferred to the gas-construction division in Houston as senior civil engineer. Other company changes include: **R. A. Watson,** supervising petroleum engineer, Gulf Coast division, transferred to Houston; **H. M. Lemex,** supervising petroleum engineer in the drilling-equipment division in Houston, transferred to the Gulf Coast division office; **T. V. Miller,** supervising petroleum engineer in Houston, transferred to the Gulf Coast division office; and **J. J. Bardgette,** civil engineer in the Southwest Texas division office, transferred to the Anahuac district.

Lloyd Gray has been elected president of Rocky Mountain Oil Corp. of Denver. He replaces **Bert Wheeler,** who has resigned.

J. H. Johnsen has been named assistant general superintendent of the Sugar Creek, Mo., refinery of Standard Oil Co. (Ind.). He is succeeded as assistant superintendent in the mechanical division at Whiting, Ind., by **J. A. Norgaard.** In the same division at Whiting, **J. H. Byrd** is now general planning foreman and **D. B. Lawrence** is assistant to the superintendent.

G. H. Sturgeon, senior geologist for Shell Oil Co. in Los Angeles, has been named division exploration manager in the new Salt Lake City division headquarters in Salt Lake City. The Salt Lake district already established there will continue to function under the new division and will be expanded to include the Great Basin area of western Utah and Nevada. Appointments to senior staff positions in the area include that of **Arthur L. Brown** as division exploitation engineer, and **M. H. Harvey** as division office manager. Both Brown and Harvey formerly were located in Ventura, Calif.

M. L. (Vern) Morris has been elected vice president of Portable Drilling Corp., Tulsa. Before joining Portable in June last year he was drilling and production superintendent for Sohio Petroleum Co. in its Oklahoma district.

H. BATEMAN

Harris Bateman has completed a year's assignment with the Petroleum Administration for Defense and returned to his position as chief engineer for Cities Service Oil Co. and Cities Service Pipe Line Co. in Bartlesville, Okla. He was director of PAD's materials division. In addition to resuming responsibilties as manager of the engineering division, he will have added duties in the purchasing, warehouse, and surplus materials departments. **B. D. (Tex) Leuty,** who supervised the engineering division operations as assistant chief engineer during Bateman's absence, has been named manager of pipe-line transportation. Leuty will be in charge of both wholly and jointly owned crude oil and products pipe lines. He will be assisted in joint interest operations by **R. E. Roehl.**

PERSONALS

R. B. McCloy, central division drilling superintendent for Stanolind Oil & Gas Co., has resigned, effective September 1, to become vice president of Decem Drilling Co. in Oklahoma City. He formerly was associated with Gypsy Oil Co. and Union Carbide & Carbon Co. before joining Stanolind in 1942. He is secretary-treasurer of the Mid-Continent district of the American Petroleum Institute's Division of Production.

Homer Lanier, assistant superintendent of the South Point, Ohio, ammonia plant of Allied Chemical & Dye Corp.'s nitrogen division, has been promoted to plant superintendent at the nitrogen division's new chemical plant at Orange, Tex.

George Harrison Baird will retire November 1 as vice president, manager of operations, and a director of Cities Service Gas Co. He will continue his association with the company, however, in a consulting capacity. He has been a vice president since 1939.

J. H. Cole hase been appointed superintendent of the chemical division of the Richmond, Calif., refinery of Standard Oil Co. of California. He succeeds **L. L. Henning,** who has been placed on special assignment.

L. G. Sweatt has been promoted to assistant compressor superintendent in the Permian division of El Paso Natural Gas Co. He formerly was plant superintendent at Eunice, N. M., and has been with the firm 16 years. Other company promotions include: **O. B. Peacore,** from district foreman at Topock, Ariz., to superintendent of the Ehrenberg pipe-line district; **T. J. Crutchfield,** who has been associated in compressor work for El Paso since 1936, to compressor superintendent; and **N. W. Ray,** from district foreman of the Deming pipe-line district, to district superintendent.

C. Malcolm Davis has joined the technical-service department of Shell Oil Co. in Houston as a reservoir engineer. He will assist in the company's petroleum-engineering training program. Davis formerly was Gulf Coast district editor for The Oil and Gas Journal in Houston.

Charles E. Webber, Sun Oil Co., Philadelphia, has been named chairman of the main technical committee of the Natural Gasoline Association of America, according to a recent announcement by N.G.A.A. President Frank M. Perry, vice president of Cities Service Oil Co., Bartlesville, Okla. **Roy Schuster,** The Chicago Corp., Corpus Christi, is vice chairman of the group. chairmen and vice chairmen, respectively, of various sub-groups of the technical committee are: absorption, **M. F. Wirges,** Cities Service Oil Co., Bartlesville, and **R. E. Styring, Jr.,** vice chairman, Atlantic Refining Co., Dallas; analysis; **A. J. Miller,** Phillips Petroleum Co., Bartlesville, and **Fred Zapffe,** Lone Star Producing Co., Dallas; liquefied petroleum gases, **R. R. Hawthorne,** Atlantic Refining Co., Dallas, and **H. R. Thomas,** Stanolind Oil & Gas Co., Tulsa; and plant control, **K. C. Bottenberg,** Phillips Petroleum Co., Bartlesville, and **Carl Vicksburg,** Carter Oil Co., Tulsa. Chairmen and vice chairmen, respectively, of other committees include: plant corrosion, **Edward C. Grecco,** United Pipe Line Co., Shreveport, and **E. W. Wallace,** Shell Oil Co., Houston; safety, **A. W. Breeland,** Lone Star Gas Co., Dallas, and **John Stradinger,** Humble Oil & Refining Co., Houston; statistics, **W. R. Lund,** Warren Petroleum Corp., Tulsa, and **J. B. Haefer,** Shell Oil Co., Houston; and traffic, **F. A. Shellhorn,** vice president, Anchor Petroleum Corp., Tulsa, and **F. M. Holloway,** Skelly Oil Co., Kansas City.

DEATHS

Sam S. Caldwell, 60, who retired a short time ago as executive vice president of the Louisiana-Arkansas division of the Mid-Continent Oil and Gas Association, died in a Shreveport hospital August 14. He joined the association in 1946 after serving three terms as mayor of Shreveport. He entered the oil business in 1917 as an employe of Gulf Refining Co. and later organized Guaranty Drilling Co. He sold his drilling interests to join the land department of the old Roxana Petroleum Corp. in 1920. Later he served as manager of the land department of Arkansas Natural Gas Corp. and operated as an independent.

Joseph E. Adrian, secretary of the South Dakota Independent Oil Men's Association and chairman of the marketing committee of the National Oil Jobbers Association, died in Yankton, S. D., recently.

F. S. Freeland, 73, Sperry, Okla., pioneer independent operator, died August 18 near Sperry. He was a native of Burton, W. Va., and moved to Oklahoma in 1907. He was active in the early oil development in Oklahoma and Texas.

Clyde E. Greeson, 63, laboratory technician in the engineering and research department of Mid-Continent Petroleum Corp., died August 15 in Tulsa. He had been with Mid-Continent 10 years.

Cleo Miller, 50, Houston oil operator associated with W. C. Curry Drilling Co., was killed in an automobile accident at Ada, Okla., August 13.

Edwin S. Hall, 66, former director, vice president, and general counsel of Esso Standard Oil Co., died August 13 at Farmington, Maine, following a brief illness. A leader in the founding of the American Petroleum Industries Committee, he served as its secretary from 1932 until 1944 and as chairman from 1944 to 1949. He retired in February 1950 after 30 years of service with Esso and Standard Oil Co. (N.J.).

Cedric K. Ferguson, 31, associate research engineer for California Research Corp., at its La Habra laboratories, died August 11 of poliomyelitis in Fresno County Hospital, Fresno. He was secretary of the Pacific Petroleum chapter of the American Institute of Mining and Metallurgical Engineers and chairman of the A.I.M.E. junior group.

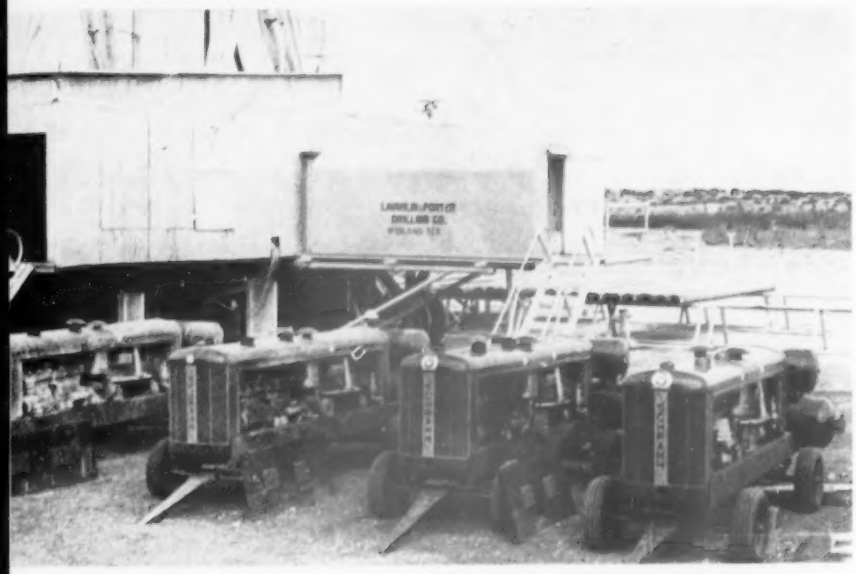
Horace Encinas, 51, chemist for Richfield Oil Corp., died recently in Long Beach, Calif.

W. A. La Rew, 47, manager of the West Texas-New Mexico district of Bethlehem Supply Co., died August 13 in Midland, Tex.

John Calvin Knight, 90, Knox, Pa., retired driller, died August 13 in an Oil City, Pa., hospital.

Jesse Wright Edmundson, 69, Houston, who retired from Pure Oil Co. in 1949, died in Houston August 17. He had worked in the production department of Pure in Houston from 1942-49.

Charles Schnare, 62, De Leon, Tex., engineer for Magnolia Pipe Line Co. since 1917, died recently.



Drilling Surface Holes With Air

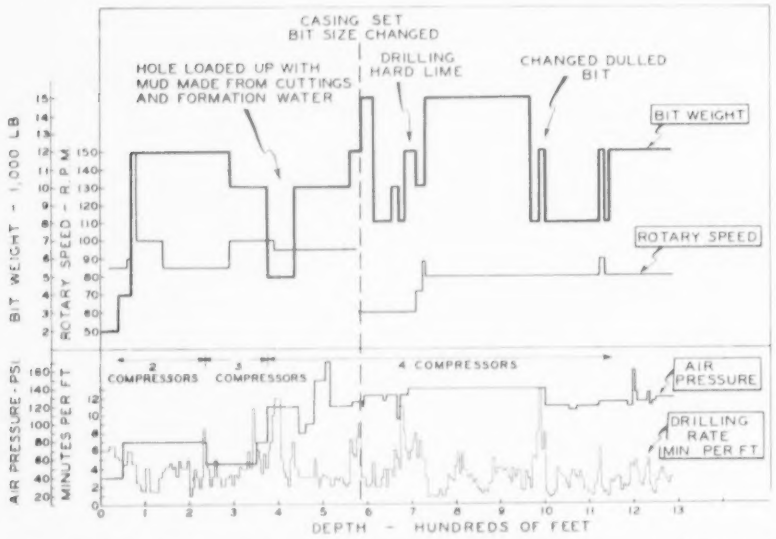


Fig. 1—Drilling data for 1,290 ft. of hole, drilled with air. Edwards lime was hard, fractured, and contained caverns in places. Sometimes the drill pipe would drop 3 to 4 ft. The first 585 ft. was cut in 40 hours' rotating time, the next 705 ft. in 38 hours.

Saves in Cavernous Formations

by Roy F. Carlson

THE latest application of air as a drilling fluid has been by Laughlin-Porter Drilling Co., of Midland, Tex., in the drilling of surface holes in the Edwards Plateau area of West Texas. Cracked and cavernous limestone formations at the surface make use of conventional mud virtually impossible physically and economically, and in the past required the use of cable tools for drilling the surface hole and setting the surface pipe.

But since the cable-tool rigs take from 10 to 30 days to drill the hole, sometimes requiring a long wait by the bigger rotary rig that drills the remainder of the well, some alternate method was sought by Laughlin-Porter. Successes of natural gas and air drilling in other areas suggested air drilling as a possible solution.

In the first test of the air-drilling method on Lone Star Producing Co. 1 Willie Tisdale, a hole was drilled from the surface to 585 ft. in an elapsed time of about 57 hours. Actual rotating time in the well was about 40 hours.

Surface pipe was set at 585 ft., and the hole was continued to 1,290 ft. with air. This 705 ft. was drilled in just about 38 hours of rotating time, and a total elapsed time of a bit over 53 hours. The first part of the hole was drilled with 13⅜-in. bit, and the hole below the pipe was drilled with an 8¾-in. bit. All drill pipe was 4½-in. and 6-in. drill collars were used to stiffen the string and weight the bit.

Fig. 1 is a chart of the drilling of this 1,290 ft. hole. The upper portion of the hole was drilled in the Edwards lime, a hard, sometimes fractured rock, which in places contains caverns. In some instances the drill pipe would drop from 3 to 4 ft. The lower portion of the hole was a bit softer, containing a considerable amount of shale.

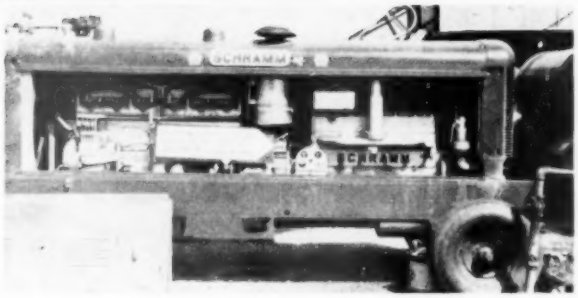
Two to Four Compressors

From two to four 600-cu.-ft. per minute compressors were used in drilling the hole, with two having proved to be adequate in subsequent surface holes drilled with air. The portable-type compressors used are rated to produce air at 200 psi. if necessary, although this pressure was not required, as illustrated by the chart.

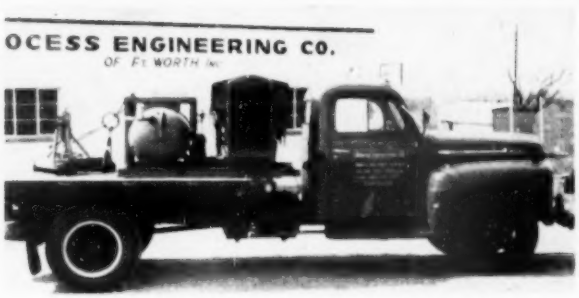
In the first 585 ft. of hole three bits were used and in the hole below the surface pipe two bits were used. Bearings of the bits used under the surface hole showed very little wear, and only the first of the two exhibited much wear on cutter teeth or gage. Three stabilizers were used on this drilling, one just above the bit and the others at 30 and 70 ft. off bottom.

One of the outstanding features of this hole was that it stayed remarkably straight; at no measurement was it off vertical more than ¼°. This straightness is attributed to being able to maintain a high rate of penetration with rather low bit weights as compared to conventional drilling with mud.

In places along the bore hole where water was encountered, air pressures would tend to climb and drilling would tend to slow down because of balling up of cuttings on the drill pipe at the collars or stabilizers. When this happened the situation was relieved by pumping water into the air stream which thinned out the balling mud and permitted it to be blown to the surface.



TRAILER-TYPE . . . One of four heavy-duty compressors used.



AIR TONG UNIT . . . Complete portable assembly.

The water flow into the bore hole was largely mudded off by the damp cuttings and no more trouble was experienced.

Arrangement of Equipment

The hookup used by Laughlin-Porter is simple. The compressors are tied directly into the high-pressure mud line of the conventional mud system. Circulation is normal down the drill pipe and up the annulus. The only special equipment used is a deflector head which fits around the kelly and deflects the return air stream and entrained cuttings to one side of the rig.

The deflector used was made from a pair of oil drums with a double-headed cap pipe and a regular wiper rubber. The rubber turns with the kelly inside the double head, deflecting most of the air stream through an opening cut in the side of the drums.

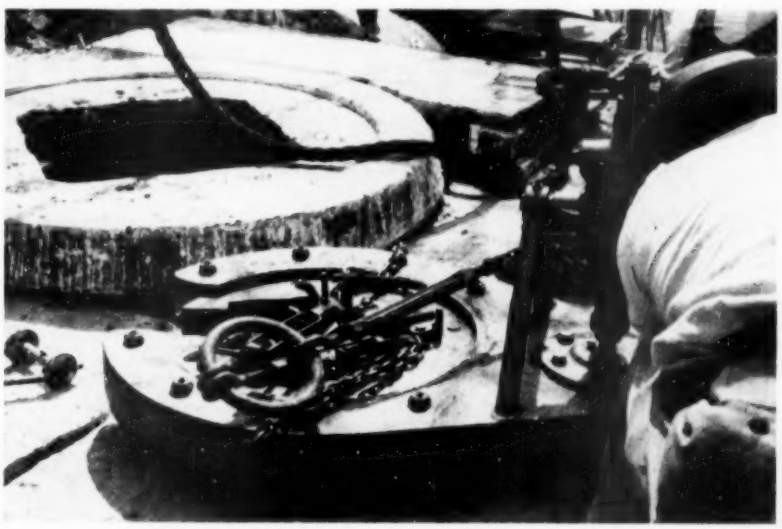
When two compressors are used a special volume tank measuring 4½ by 17 ft. is employed which affords sufficient volume of air when needed.

Bit life in this and other air-drilled holes is considerably longer than in conventional mud drilling. The bits last longer and cut more footage, resulting in about a 50 per cent reduction in number of bits along with a reduction in drilling time. Increased bit life has been attributed to cooling by the expanding air and to lower bit weights.

In addition to the 1,290-ft. job described here, several other surface holes have been drilled with air as the circulating medium. These have all been about 500 ft. deep and all have been highly successful except one in which a deflector head was not used. In this latter case, cuttings piled up around the top of the bore hole and would fall back into the hole.

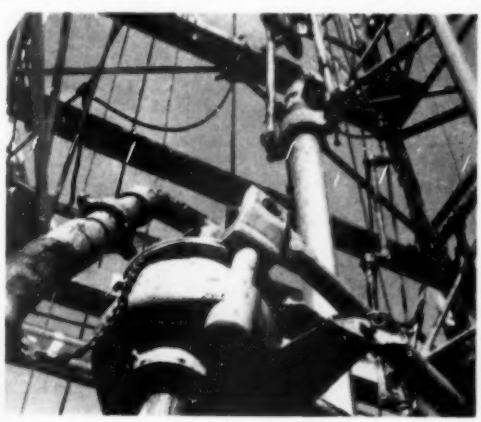
Most of these holes encountered caverns in the surface limestone of such an extent that returns of air would be lost. However, loss of air circulation did not appear to hamper drilling in any way, with the cuttings apparently being blown back into the caverns far enough that they would not fall back into the bore hole around the drill pipe.

Most of these holes were drilled with bits varying from 11 to 13⅜ in. diameter. The best time on these surface holes was recorded in one drilled to 550 ft. in 31 hours of actual drilling time. This compared with the 10 to 30 days required for cable tooling one of these surface holes amply illustrates why Laughlin-Porter resorted to the use of air.



LAUGHLIN-PORTER Drilling Co., Midland, Tex., uses air tongs.

IN, UP, AND OUT . . . Air circulation is normal (down drill pipe, up annulus). Only special equipment used is the deflector head to fit around kelly, moving the return air stream and entrained cuttings to one side of the rig.



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
OFFER TO LEASE AND LEASE FOR OIL AND GAS
ASSIGNMENT AFFECTING RECORD TITLE TO OIL AND GAS LEASE
BOND OF OIL AND GAS LEASE OPERATOR
BOND OF OIL AND GAS LESSEE
NATION-WIDE PERSONAL OIL AND GAS LEASE BOND
NATION-WIDE OIL AND GAS BOND

Here are some of the forms which accompany application for leasing public lands.

Want to Lease From Uncle Sam?

Here's what he asks prospective lessees to do

by Bertram F. Linz
Washington Editor

ADMINISTRATION of the oil, gas, and mineral resources of the federal Government's public lands is vested in the Interior Department and conducted through the Bureau of Land Management and the Geological Survey.

The regulations for operations on the public lands are based on the Mineral Leasing Act of February 25, 1920, as subsequently amended. The act applies to all public lands except those situated in national parks and monuments; Indian reservations; incorporated cities, towns, and villages; or naval petroleum and oil-shale reserves. The department, however, also handles the leasing of Indian lands and acquired lands turned over to it by other federal agencies.

Because in the leasing of public lands the Government acts in the capacity of landlord rather than as a purely regulatory body, it is necessary to have a procedure for the granting of leases as well as regulations for operation under the leases.

Leases on the public lands may be secured only by citizens of the United States, associations of such citizens, corporations organized under the laws of the United States or any state or territory or, in the case of oil, oil shale or gas, municipalities. Aliens may not acquire or hold any direct or indirect interest in permits or leases, but may own stock in corporations holding them if the laws of their country do not deny similar or like privileges to United States citizens.

The granting of a permit or lease for the prospecting, development, or production of deposits of any one mineral does not preclude the issuance of other permits or leases on the same land for deposits of other minerals, with suitable stipulations for simultaneous operation.

All lands subject to disposition under the act which are known or believed

How Much Federal Land and Where . . .

The latest estimate places the total of federally owned lands in the continental United States at 457,600,000 acres, just about 25 per cent of the total land area of the country.

The Government owns land in every state, but the greater part of its holdings—406,700,000 acres—are in the 11 westernmost states. More than half of the land is administered by the Interior Department, but the Department of Agriculture holds some 165,000,000 acres or more, the military have well over 20,000,000 acres and other agencies hold in excess of 1,000,000 acres.

The most extensive holdings under the jurisdiction of the Bureau of Land Management, including the lands available for oil and gas leasing, are as follows:

Nevada, 46,100,000 acres; **Utah,** 25,300,000 acres; **Wyoming,** 17,700,000 acres; **California,** 16,800,000 acres; **New Mexico,** 15,600,000 acres; **Oregon,** 15,400,000 acres; **Idaho,** 13,000,000 acres; **Arizona,** 12,700,000 acres; **Colorado,** 8,700,000 acres; **Montana,** 7,700,000 acres, and **Washington,** 600,000 acres. The only other states in which the bureau administers as much as 100,000 acres are **South Dakota,** 300,000 acres, and **North Dakota** and **Arkansas,** 100,000 acres.

DESIGNATION OF OPERATOR
SUNDRY NOTICES AND REPORTS ON WELLS
LOG OF OIL OR GAS WELL
LESSEE'S MONTHLY REPORT OF OPERATIONS

. . . And here are more forms, which keep tabs on the lessee's operations.

to contain oil or gas may be leased. When lands are within the known geologic structure of a producing field, leases must be awarded on competitive bids in units not exceeding 640 acres to the highest responsible qualified bidder at a royalty of not less than 12½ per cent. Leases for not to exceed 2,560 acres within a 6-mile square may be issued for all other land subject to the act to the first qualified offerer at a royalty of 12½ per cent. All leases, except renewals of certain 20-year leases, are for a primary term of 5 years and so long thereafter as oil or gas is produced in paying quantities.

No leases may be issued for land within ½ mile of the exterior boundaries of a naval petroleum or helium reserve unless the land is being drained of its deposits by wells on privately owned land or it is determined by the Secretary of the Interior that operations under a lease will not adversely affect the reserve through drainage from known productive horizons.

The maximum that may be held under lease in any one state by a single interest is 15,360 acres, but there is no limitation upon the number of states in which such maximum interests may be held simultaneously.

The leasing of the public lands is handled by the Bureau of Land Management with advice from the Geological Survey as to the status of lands covered in individual applications.

Since leases in known structures are awarded on the basis of bonus bids invited by the bureau, operators seeking such leases need only comply with the requirements for eligibility.

Leases on nonproven lands are noncompetitive and are granted to the first applicant to file an offer to lease, which if approved will be the actual lease, on Form No. 4-1158. For land located in areas covered by bureau field offices, applications should be filed with the appropriate regional office. Applications for other lands must be filed with the bureau in Washington.

Applications on Form No. 4-1158 must be filed in quintuplicate. They must show an adequate description of the lands to be leased, and must be accompanied by the filing fee of $10 and the first year's rental payment at the rate of 50 cents for each acre or fraction thereof.

Once a lease is granted the lessee can hold the lands for the 5-year term with no rental payments for the second and third years and rental at the rate of 25 cents per acre or fraction thereof each year for the fourth and fifth years. There is no requirement that the lessee do any work on the land, and the lease may be extended for a second 5 years at the rental rate of 50 cents an acre per year. Such renewals are now secured by letter, but the bureau is developing a form on which application for extension may be made.

If necessary for government purposes, lands may be withdrawn from lease on 90 days' notice to the lessee.

Lands held under leases may be assigned in whole or in part, with the approval of the bureau. Application for approval of assignments must be made in triplicate on Form No. 4-1175 and must be accompanied by a filing fee of $10. The assignment must show the extent of the interest conveyed to the assignee, any overriding royalty reserved to the assignor, and any overriding royalties previously reserved, both in percentages only.

The holder of a lease may develop it himself or turn it over to an operator for development. But before any drilling operations can be started it is necessary for the lessee or his designated operator to file a bond.

Where bond is filed on a single lease it may be either a personal or surety bond, in the sum of $5,000. Personal bonds require the deposit of negotiable United States securities as surety. The bond is furnished on Form 4-208 by lessees and Form 4-238 by operators.

Where a lessee or operator holds more than one lease he can cover all his interests by a nation-wide bond, in the sum of $150,000 or at the rate of $25,000 for all public lands held in any one state or territory, using Form 4-1168 for personal bonds or Form 4-1167 for surety bonds.

When it is determined to go ahead with the development of a lease, the Geological Survey takes jurisdiction over all operations.

A lessee may develop his property himself or designate an operator to do so. Where an operator is named, notice of his designation must be filed by the lessee on Form 9-1123, in triplicate.

All operations on public-land leases are closely supervised and operators are required to conform to detailed regulations and make periodic reports. The regulations are issued as Part 221, Title 30 of the Code of Federal Regu-

lations, and some of the pertinent provisions are summarized as follows:

221.19—Where operations on a lease are not conducted by the record owner, a "designation of operator" must be submitted prior to commencement of operations.

221.20—Except where necessary to protect leased lands against wells on land owned by others and the consent of the supervisor is secured, no well may be drilled within 200 ft. of any outer boundary of the leased lands.

221.21—Lessees may be required to submit acceptable well-spacing and well-casing programs for approval by the supervisor, but these may be modified from time to time as conditions warrant.

The lessee may not begin to drill, redrill, repair, deepen, plug back, shoot, or plug and abandon any well, make water shutoff or formation test, alter the casing or liner, stimulate production by vacuum, acid, gas, air, water injection or any other method, change the method of recovering production, or use any formation or well for gas storage or water disposal without first securing approval of the supervisor.

The lessee shall drill diligently and produce continuously from such wells as are necessary to protect the Government from loss of royalty by reason of drainage or, in lieu thereof, with the consent of the supervisor, pay a sum estimated to reimburse the Government for such loss of royalty.

Whenever drilling or producing operations are suspended for 24 hours, or more, the mouth of the well must be closed with a suitable plug or other fittings.

221.22—The lessee must mark each derrick or well with his name or the name of the operator, the serial number of the lease, and the number and location of the well. All abandoned wells must be marked with a permanent monument, showing number and location.

221.23—The lessee must keep on the leased lands or at his headquarters in the field, or otherwise conveniently available to the supervisor, accurate and complete records of all operations, which shall show all the formations penetrated, the content and character of oil, gas, or water in each, and the kind, weight, size, and landed depth of casing used in drilling each well.

221.24—When drilling in wildcat territory or in any field where high pressures are likely to exist, the lessee shall take all necessary precautions for keeping the well under control at all times, and at the time the well is started shall provide the proper high-pressure fittings and equipment; under such conditions the conductor string of casing must be cemented throughout its length, unless other procedure is authorized or prescribed, and all strings of casing must be securely anchored.

221.25—When drilling with cable tools, the lessee shall provide at least one properly prepared slush pit for mud and cuttings suitable for the mudding of a well and where necessary may be required to provide a second pit for sand pumpings and other materials obtained from the well that are not suitable for mudding.

221.26—When drilling with rotary tools, the lessee may be required to

(Continued on page 122)

Who Administers the Public Lands?

Secretary of the Interior: Douglas McKay.
Assistant Secretary for Public Land Management: Orme Lewis.
Assistant Secretary for Geology: Felix Wormser.
Address: Interior Building, Washington 25, D. C.

Officials of the Bureau of Land Management

Edward Woozley, administrator.
William Zimmerman, Jr., associate director.
William Pincus, assistant director.
Lewis E. Hoffman, chief, Division of Minerals.
Charles R. Drexilius, assistant chief, Division of Minerals.
Interior Building, Washington 25, D. C.

Field Offices

Region I—(Washington, Oregon, and Idaho):

Roscoe E. Bell, regional administrator, Bureau of Land Management Building 6, Swan Island Station, Portland 18, Ore.
Karl S. Landstrom, regional chief, Division of Lands and Minerals (same address).

Region II—(California and Nevada):

Luther T. Hoffman, regional administrator, Bureau of Land Management, 630 Sansome Street, San Francisco.
Joseph H. Favorite, regional chief, Division of Minerals (same address).

Region III—(Montana, North Dakota, South Dakota, Wyoming, Nebraska, and Kansas):

Westel B. Wallace, regional administrator, Bureau of Land Management, 1245 North Twenty-ninth Street, Billings, Mont.
Joseph C. Conrace, regional chief, Division of Minerals (same address).

Region IV—(Utah and Colorado):

H. Byron Mock, regional administrator, Bureau of Land Management, 238 Federal Building, Salt Lake City.
Howard J. Vander Veer, regional chief, Division of Minerals (same address).

Region V—(Arizona, New Mexico, Texas, and Oklahoma):

E. R. Smith, regional administrator, Bureau of Land Management, 1015 West Tijeras Avenue, N. W., Albuquerque, N. M.
William H. Burnett, regional chief, Division of Minerals (same address).

Region VI—(All other states):

Herman S. Price, regional administrator, 224 Twelfth Street, S. W., Washington 25, D. C.

Region VII—(Alaska):

Lowell M. Puckett, regional administrator, Bureau of Land Management, Federal Building (Box 480), Anchorage, Alaska.

Regional Land Offices

Operators seeking leases in the following states should file with the appropriate state office.

Oregon: Mrs. Frances A. Patton, manager, Building 1, Swan Island Station, Portland.
Washington: F. W. Merewether, manager, 209 Federal Building, Spokane.
Idaho: Paul A. Shepard, manager, Post Office Building, Box 2237, Boise.
Southern California: Paul B. Witmer, manager, 1512 Post Office Building, Los Angeles.
Northern California: James M. Gibbons, manager, 352 New Federal Building, Sacramento.
Nevada: Albert L. Simpson, 322 Post Office Building, Reno.
Montana: William Riddell, manager, 1245 North Twenty-ninth Street, Billings.
Wyoming: Perry T. Williams, manager, 405 Federal Building, Cheyenne.
Colorado: Harold J. Burback, manager, 437 Post Office Building, Denver.
Utah: Ernest E. House, manager, 313 Federal Building, Salt Lake City.
Arizona: Thomas F. Britt, manager, 234 W. Cambelback Road, Phoenix.
New Mexico: James A. DeLany, manager, 325 South Castillo Street, Santa Fe.
Alaska: Alfred P. Steger, manager, Box 110, Fairbanks. (New manager to be assigned), Box 1740, Anchorage.
Applications from all other states should be filed with the administrator for Region VI, Herman S. Price, Room 212, 224 Twelfth Street, S. W., Washington 25, D. C.

Officials of the Geological Survey

Director: William E. Wrather.
Assistant director: Thomas B. Nolan.
Chief, Conservation Division: H. J. Duncan.
Branch chief: H. G. Barton.
Address: General Services Administration Building, Washington 25, D. C.

Field Offices

Northwestern Region: J. R. Schwabrow, supervisor, 305 Federal Building, P. O. Box 400, Casper, Wyo.

Mid-Continent Region: J. R. Reeve, supervisor, 239 Federal Building, P. O. Box 311, Tulsa 1, Okla.

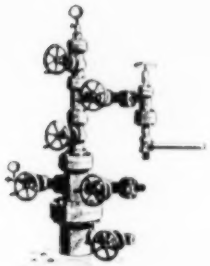
West Coast Region: L. G. Snow, supervisor, Post Office and Courthouse Building, Room 1401, Los Angeles 12, Calif.

Southwestern Region: John A. Anderson, supervisor, 334 Federal Building, P. O. Box 997, Roswell, N. M.

Eastern Region: Supervisor, R. E. Speer, 3227 General Services Administration Building, Washington 25, D. C.

BIW NON-LUBRICATED GATE VALVE

The BIW Valve has been proved dependable under the most difficult well conditions. The heavy duty thrust stem bearing makes opening and closing easy without the use of a cheater. A positive, tight shut-off is made every time because the BIW Valve is non-lubricated, requires little attention, and effects a tight closure with metal-to-metal seals.



The positive operation of the BIW Valve is a feature of the complete BIW Tree

The complete BIW tree puts the undivided responsibility of one of the industry's oldest manufacturers squarely behind your well. In East Texas, the Gulf Coast, and the Permian Basin, BIW well head equipment has proved itself over the years under practically all well conditions. When you invest in well head equipment, invest for the life of the well with the complete BIW Tree. BIW Well Head Equipment is built from 1,000 to 10,000 pounds working pressure and combines the latest in engineering design with the best in field practice.

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Subsidiary of American Locomotive Co.
General Sales Office: 1404 Dunlavy St., Houston 19, Texas
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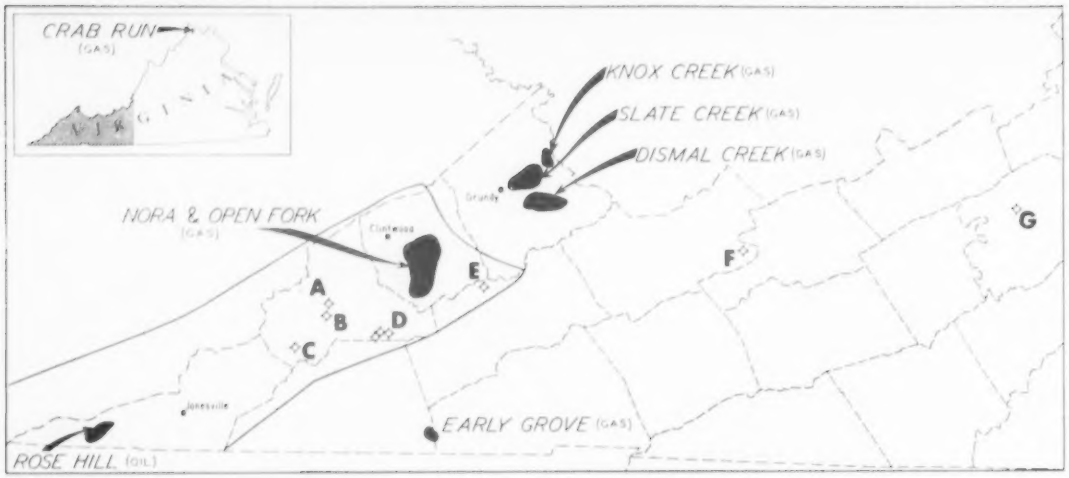


Locations of the gas fields and the single oil field in Virginia are shown by this map of the western portion of the state and the small inset of the total state. Lettered dry holes are discussed in text.

Capsule History of Oil in Southwest Virginia

FROM the latter part of the last century when the Nettle Patch well was drilled in Wise County, Virginia, until 1948, only a few scattered tests were drilled in southwestern Virginia in the attempt to discover oil or gas in commercial amounts. During this period the only development of note occurred in two rather restricted areas, Rose Hill oil field and Early Grove gas field.

Serious attention from oil operators was first attracted to the region by the discovery of oil near the village of Rose Hill in Lee County, Virginia. This development was significant in that it was the first petroleum production to be secured, not only in Virginia, but in any area east of the Cumberland-Allegheny Plateaus. Intermittent drilling had occurred in Lee County since the year 1910, but the first important production was not secured until 1942. After fairly intensive development in subsequent years, production declined to a total of a little less than 10,000 bbl. from 12 wells during 1952. This represented a decrease of about 1,000 bbl. from the total produced from 11 wells during the year 1951. During recent months only one rig has been in operation in the area. This was drilling below the usual productive zones from fractures in the Trenton limestone in an attempt to test the Copper Ridge dolomite.

Some Gas Since 1938

Small annual amounts of gas have been produced and marketed locally from Early Grove gas field in Scott and Washington counties since 1938. Less than 40 million cubic feet was sold from this field during 1952. Production from Early Grove field is from sandy zones in the Little Valley limestone of Warsaw age.

Prior to 1948 these relatively small amounts of oil and gas from Rose Hill and Early Grove fields comprised the total commercial production for Virginia.

In addition to the Rose Hill and Early Grove development, various scattered wildcast were drilled in southwestern Virginia during the years preceding 1948. Of these the following are worthy of note:

In 1932-1933 the Penn-Ohio Gas & Oil Co. drilled a test in Russell County on the Sourwood Mountain anticline to a total depth of 6,002 ft. through the Devonian shale (E on map). Although shows of gas were reported, the well was plugged and abandoned without shooting.

From 1932 to 1934 Benedum-Trees was drilling and fishing on the Kaufman well (B on map) 5 miles northeast of Norton in Wise County. Failure to set 7-in. casing in the top of the Big lime below the Pencil Cave resulted in loss of the hole. The total depth was 3,670 ft. and the well completed above the base of the St. Louis cherty limestone.

Virginia Coal & Iron Co. drilled three wells in the early forties on the plunging northeast end of the Powell Valley anticline (D on map). One was drilled through the horizon of the Oriskany to a total depth of 5,348 ft. Another of these wells made a heavy show of gas in the Ravencliff sand at a depth of 1,450 ft.

Deepest Test in 1949

In 1949 the deepest test drilled in Virginia was completed by The California Co. on a location 2 miles southwest of Blackburg in Montgomery County (G on map). It was drilled with rotary tools to a total depth of 9,340 ft. in the Moccasin limestone. An estimated 50 M.c.f. of gas was reported at a depth of from 7,350 to 7,480 ft. in the Martinsburg formation.

In 1950 the United Producing Co. completed its 1 J. M. Hoge (F on map) near the center of the Burkes Garden area in Tazewell County. The well was plugged and abandoned at a total depth of 5,632 ft. in the Cambrian.

In 1951, New York Mining & Manufacturing Co. completed its 1 Graham (A on map) at a depth of 6,057 ft. through the horizon of the Oriskany. Although shows of gas were reported in the Devonian shale, the well was not shot and finally plugged and abandoned. The last test was drilled in Wise County about 3 miles northeast of Norton.

Another noteworthy test (C on map) was drilled in Wise County, Virginia, in 1949. Located in the vicinity of Big Stone Gap where Silurian and Devonian beds are exposed on the crest of the Powell Valley anticline, the well was drilled to a total depth of 4,862 ft. in Cambrian dolomite. In all probability this well was bottomed at a depth above the sole of the Cumberland overthrust.

Natural-Gas Developments In Southwest Virginia

Developed gas reserves for Dickenson and Buchanan counties are estimated at 120,000 M.M.c.f. and proven undeveloped reserves at 200,000 M.M.c.f.

by David M. Young*

THE more or less intensive development that has been under way in southwestern Virginia during the past 4 years was started by the completion of the United Producing Co. 4 W. M. Ritter in January 1948. This well, located on Dismal Creek, about 7 miles southeast of Grundy, the county seat of Buchanan County, made 17 million cubic feet of gas from the Ravencliff sand of Upper Mississippian age at a total depth of 2,301 ft. United Producing has continued development in Buch-

*Chief geologist, Clinchfield Coal Corp., Dante, Va. Paper presented at the technical session of the Kentucky Oil and Gas Association meeting, Lexington, Ky., 1953.

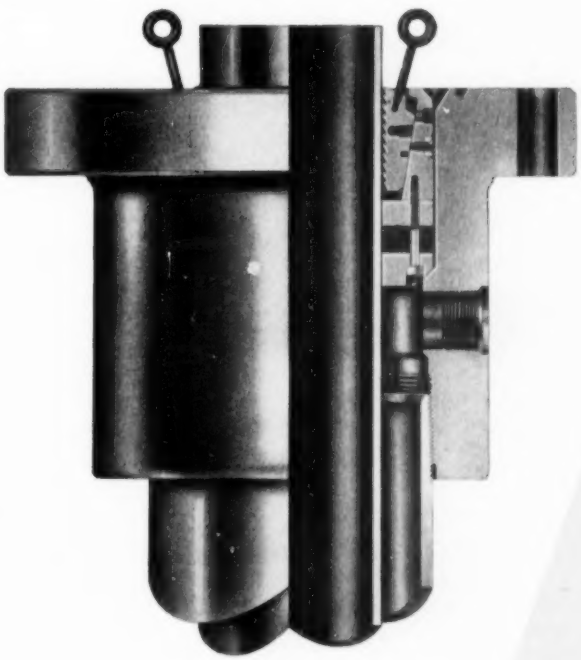
meet the

new king

of the medium duty

casing heads

The new O-C-T "C-20" Casing head design has eliminated one of the major causes of casing head troubles in the medium duty field. Here's how: the O-C-T "C-20" employs a resilient seal ring which provides an effective seal ***automatically*** for the life of the well in any climate. This means that the C-20 design puts the packing element under constant compression, regardless of temperature changes. In addition, the design eliminates the "human factor" present when compression is applied manually. Check the other features, advantages, and safety this new O-C-T head brings to the field . . . then write for the C-20 Brochure containing Engineering Nomograph for Calibrating Casing Loads and Pressures . . . Or ask your O-C-T Representative for details. Available through more than 700 supply store locations.



O-C-T C-20 CASING HEADS

THE FIRST AND ONLY QUICK-SETTING, POSITIVE-SEALING WELL HEADS DESIGNED ESPECIALLY TO ELIMINATE OPEN HOLE HAZARDS IN MEDIUM DEPTH WELLS.

1. Seals and suspends casing before blowout preventers are removed.
2. Saves hours of costly rig time — simplifies installation.
3. Sealing element, slip bowl and slips are assembled at the O-C-T plant as a single unit that may be wrapped quickly around the casing, latched and dropped into place from the derrick floor.
4. It employs a resilient seal ring which provides an effective seal for the life of the well in any climate.

Oil Center Tool Co.

P. O. Box 3091 Houston, Texas

Expert Representatives: Sterling Areas — Le Grand, Sutcliff & Gell, Ltd., Rochester, Kent, England. Address Export Inquiries for All Other Countries to P. O. Box 3091, Houston 1, Texas

anan County during subsequent years along with Pipeline Construction & Drilling Co., United Fuel Gas Co., and Tate Oil & Gas Co.

By the end of 1952 a total of 61 wells had been completed in Buchanan County. Of these completions, 27 wells had a total initial open flow of 119 million cubic feet and 34 wells were dry or yielded only small shows. Additional drilling to May 10, 1953, has increased the total initial open flow to 125 million cubic feet.

With the exception of a few outlying wells, most of the development in Buchanan County has been in Slate Creek and Knox Creek fields from 2 to 10 miles northeast of Grundy, and Dismal Creek field about 7 miles southeast.

The greater part of Buchanan County production is from the Ravencliff sand, the Big lime, with small open flows developed in the Salt sand, Maxon, Berea, and Devonian shale. Depths average about 2,500 ft. for Ravencliff wells, 3,500 ft. for Maxon, 4,000 ft. for the Big lime, 5,000 ft. for Berea wells, and 6,000 ft. for wells drilled through the Devonian shale. Ravencliff rock pressures range from 650 to 700 psi. and those of Big lime wells from 1,100 to 1,400 psi.

The outstanding feature of development during recent months, not only in Buchanan County, but in all of southwestern Virginia was the completion in 1952 of the 33-mile, 8, 10, and 12-in. extension of the transmission system of Hope Natural Gas Co. This line was terminated at a point in Dismal Creek field near the discovery well. Deliveries began in November 1952 and totaled 1,135,545 M.c.f. by December 31 of that year.

Currently, United Producing Co. reports seven strings of tools in operation, Pipeline Construction two, and Clinchfield Coal Corp. one, all on locations in Buchanan County.

Dickenson County Development

After United Producing was successful in its efforts to develop large volume gas in Buchanan County, Clinchfield Coal Corp. spudded the first well on its property in Dickenson County, Virginia, in October 1948. The well completed in March 1949 as a producer in the Big lime and from that time until the present Clinchfield has carried on a fairly intensive development program on their fee and lease properties in Dickenson, Buchanan, and Wise counties.

To May 10, 1953, 40 wells had been completed. Of these completions, 33 wells have been shut in with a total initial open flow of 58 million cubic feet and 7 have been plugged and abandoned.

Most of Clinchfield's development is in Nora and Open Fork fields in South-Central Dickenson County, although scattered wells have been drilled elsewhere in the county and in Buchanan County to the north.

During 1951 this company engaged in a program of seismic exploration over much of its property in Dickenson County. At that time Nora field had been almost completely delineated by development drilling and this area was shot first for control.

Most of the developed gas reserves in Dickenson County are in the Big lime, with smaller amounts in the Salt sand, Ravencliff, Maxon, Berea, and Devonian shale. Depths average about the same as in Buchanan County: 4,000 ft. to the base of the Big lime and 6,000 ft. through the Devonian shale. Rock pressures in the Big lime range from 1,000 to 1,200 psi. and those in Devonian shale wells from 700 to 900 psi. A recently completed Maxon well with a settled open flow of more than one-half million cubic feet rocked to 960 psi. in 5 days.

At the present time Clinchfield has in operation 12 strings of tools, of which 9 are in Dickenson County, 2 in Wise, and 1 in Buchanan County.

Rockingham County Development

Although not located in southwestern Virginia, Rockingham County in North-Central Virginia in the Valley and Ridge province was the scene of Oriskany sand exploration during 1951 and 1952 at Crab Run field.

The Souder well was deepened and completed as an Oriskany producer in November 1951. The total depth was 2,995 ft., initial open flow was 1,043 M.c.f., and 48-hour rock pressure 1,300 psi.

Three additional wells were completed in Rockingham County during 1952, one of which was dry at a total depth of 3,098 ft. This well was not shot. United Fuel Gas Co. completed the 1 W. J. B. Moyers at a total depth of 3,768 ft. with the Oriskany sand from 3,563 to 3,761 ft. Oriskany gas gaged 158 M.c.f. before shot and 286 M.c.f. after. Snee & Eberly completed 1 S. L. Moyers at a total depth of 3,077 ft. with the Oriskany top at 3,036 ft. The initial open flow was 9,700 M.c.f. natural with a shut-in pressure of 1,310 psi. in 25 minutes. No new tests were started in Rockingham County following completion of the latter well.

Geologic and Structural Relationships

The outstanding feature of the geology of that portion of southwestern Virginia being currently developed for natural gas is the fact that so much of the area lies within the confines of the Cumberland overthrust block. All of Dickenson and Wise counties are within the block but only a very small portion of Buchanan County is included.

Many authorities on Appalachian structure have published hundreds of pages concerning the mechanics of overthrusting involved in movements of the Cumberland overthrust block along the Pine Mountain fault. Nothing will be mentioned here other than the contribution to existing knowledge of this classic structure by some of the deeper drilling in southwestern Virginia.

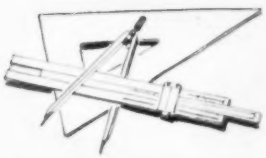
It is routine procedure in Devonian shale wells drilled by Clinchfield in Dickenson and Wise counties to bottom them in the top of the Corniferous lime before shooting the Devonian shale section. In so doing, all wells penetrate a shear zone from 60 to 100 ft. above the top of the Corniferous where strong gas blowouts are encountered and tools frequently hung with resulting fishing jobs. The bituminous shale in this zone is highly slickensided, frequently almost coal-like in appearance, with numerous veinlets of calcite up to ½ in. in thickness. This is, presumably, the position of the Pine Mountain fault or sole of the Cumberland overthrust block.

It is interesting to note, however, that when one compares well sections in this area to those in eastern Kentucky and Buchanan County, Virginia, and allows for regional dip and formation thickening, the correlations are precisely what one would expect if faulted relationships did not exist.

The Cumberland block, from a point in Wise County on toward its southwestern end, exhibits the conspicuous Powell Valley anticline which brings rocks of Cambrian age to the surface in Lee County. Here, the overthrust block has been cut through by erosion to expose in a series of fensters rocks of Silurian and Ordovician age beneath the sole of the overthrust. It is in one of these fensters that the Rose Hill oil was discovered and drilling outside the fensters in the overthrust block has penetrated the Pine Mountain fault to encounter both oil and gas.

When one traverses the axis of the Powell Valley anticline from a point near the fenster area of Lee County to the northeast in the vicinity of Big Stone Gap and beyond, where the older Paleozoic rocks plunge beneath the coal measures, one may see on outcrop all members of the section drilled in Dickenson County. Toward the base of the Devonian shale section the Genessee shale in this area exhibits conspicuous drag folds and shearing with consequent slickensiding of the shale. This may not be the zone of blowouts drilled in Dickenson County but it is interesting to note that it occupies precisely the same stratigraphic position. And, reversing the traverse, one may from

There is more than meets the eye..



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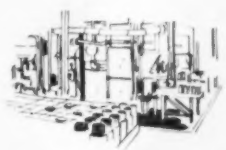

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ACTUAL PHOTOGRAPH OF MAGCOGEL MUD

this point continue down the section to southwest where the Copper Ridge dolomite is found resting upon rocks of Silurian and Ordovician age in the Lee County fensters.

Local shearing is not confined to the Devonian shale in the subsurface section of Dickenson County. The high-quality Widow Kennedy coal, widely exposed in Dickenson and Wise counties, is a zone of horizontal shearing that has resulted in the coal thickness being so highly variable over short distances that it cannot be mined on a commercial scale.

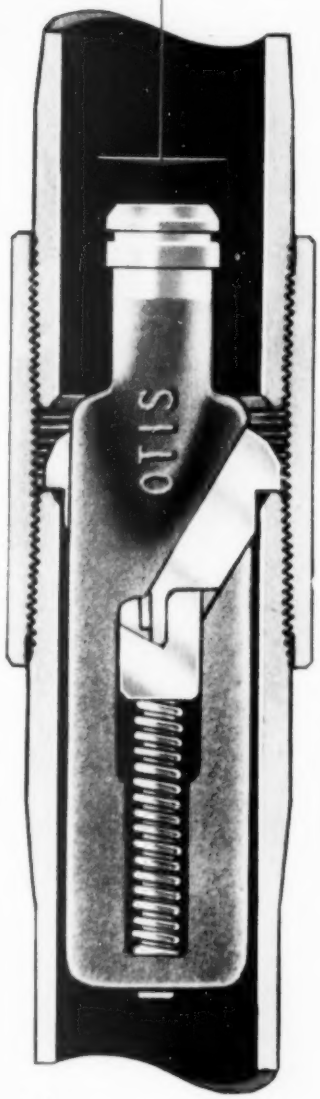
Production Problems

Drilling problems in southwestern Virginia are very much the same as those encountered elsewhere in the Appalachian basin where cable tools are used, with the exception that regional dip and thickening cause drilling depths to be excessive. Long strings of 8⅝ and 7-in. casing must be run, frequently in the neighborhood of the collapse limit. This difficulty is alleviated to a considerable extent by the use of suspension-type casing heads. Caving sections of red rock in the Pennington interval are thicker than in eastern Kentucky and consequently cause more trouble and require more cementing.

As most of the developed reserves in Dickenson County have been obtained in the Big lime, obviously acidizing procedures are a primary consideration. It is the practice of Clinchfield to core all shows and pays in the Big lime. The Baker core barrel has been used with a high degree of success at depths of more than 4,500 ft. If sufficient gas is obtained to warrant an acid treatment, the well is shut down until complete core analyses can be run. This work is done by Dowell Incorporated in its research lab in Tulsa. Working in close cooperation with Dowell engineers after the results of core analyses have been obtained, a procedure is worked out for treating each well. Certainly each well poses an individual problem and certainly details of each acidizing procedure will vary from well to well.

The Devonian shale section, frequently along with the Berea, is shot with 80 per cent gelatine when drilled in Dickenson County. Again, because of the excessive shale thickness, frequently more than 1,200 ft., it is necessary to use very heavy shots.

In southwestern Virginia, the stratigraphy and lithology of gas reservoirs, surface and subsurface geology, and drilling and production problems differ very little from the situation in eastern Kentucky, West Virginia, and elsewhere in the Appalachian basin. Although development is in its initial stages, it is continuing at a steady pace.



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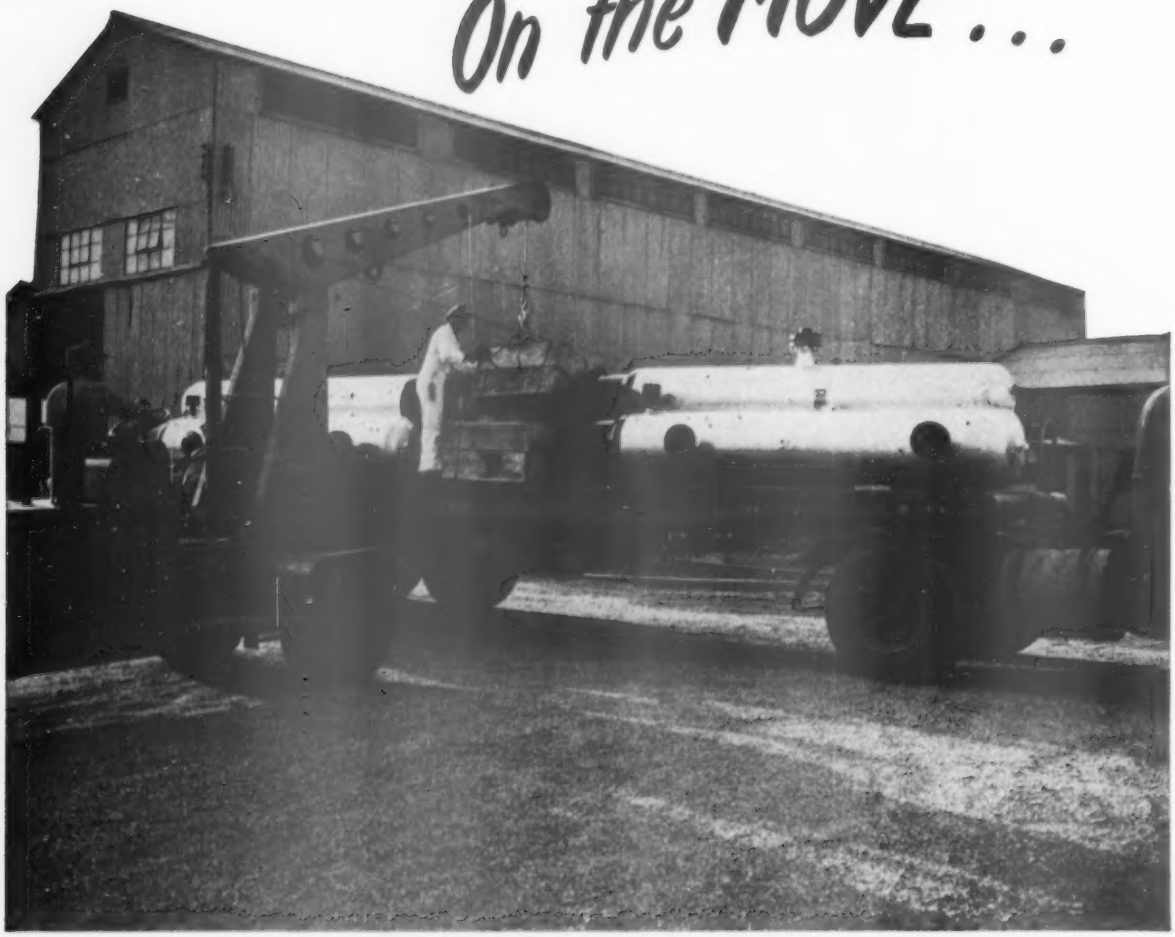

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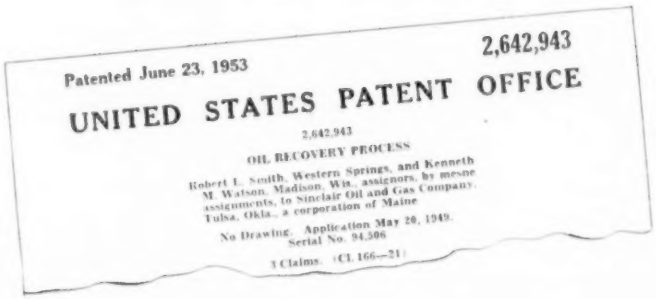
Sinclair Gets Patent on New Oil-Recovery Process



Patented June 23, 1953 2,642,943

UNITED STATES PATENT OFFICE

2,642,943

OIL RECOVERY PROCESS

Robert L. Smith, Western Springs, and Kenneth M. Watson, Madison, Wis., assignors, by mesne assignments, to Sinclair Oil and Gas Company, Tulsa, Okla., a corporation of Maine

No Drawing. Application May 20, 1949, Serial No. 94,506

3 Claims. (Cl. 166—21)

ONE of the methods of increasing recovery of crude oil involves application of heat to the reservoir. Magnolia Petroleum Co.'s "In-Situ Combustion" has received widespread attention throughout the industry following publication of an engineering report on it in The Oil and Gas Journal's issue of August 10, 1953, pages 92-96 et seq.

Sinclair Oil & Gas Co. and Sinclair Research Laboratories also have pursued laboratory and field investigations on thermal oil-recovery methods, and some of their work and inventions are disclosed in the material on these pages.

Language of Patent (Abridged)

This invention relates to improvements in the production of oil and gas from oil-bearing formations, and more particularly to an improved method for recovering gas and oil from partially depleted oil-bearing formations by thermal means.

Since the very early days of production of oil from subterranean formations, thermal methods for improving recoveries by lowering viscosity and through distillation and cracking have been proposed. Despite the theoretical soundness of some of these proposals these methods have proved characteristically impractical because of the high heat consumption required to improve recovery, for these methods have depended upon heating the entire underlying oil-bearing stratum to the temperature at which the desired improvement in flow would develop, and often have required combustion of substantial proportions of the recoverable oil to warrant consideration at all.

New Discovery

In contrast to these methods, we have now discovered a method of recovery embodying the advantages of the old thermal schemes but which is characterized by propagation of a high-temperature zone coupled with an approximately coincident internal-combustion wave front within the oil-bearing formation. The high-temperature zone is expanded in a relatively horizontal direction within the formation in such a manner as to sweep out residual oil by force of a heat transmissive gas flow. The combustion wave front is continuously or intermittently generated within the formation and maintained in an approximately coincident relation to the high-temperature zone or heat-transfer wave so as to continuously or intermittently revivify the heat content of the expanding hot zone.

Thus we propagate a high-temperature zone within the formation by forcing hot combustion gases into the formation from an inlet well under elevated pressure for a period of time sufficient to heat up the surrounding sand structure and produce gas and/or oil flow from one or more nearby outlet wells. The hot gases preferably derive from bottom-hole burning, that is, from the burning of fuel at high rates of heat release at formation level in the input well. When a high-temperature zone surrounding the inlet well for a considerable distance has been established, fuel burning is discontinued, and the movement of the heat zone horizontally out into the formation is continued by cycling cold gases through the inlet well.

We have found that a small percentage of asphaltic or carbonaceous material usually remains in the porous structure following passage of the hot gases. For example, purging of an oil sand having a porosity of about 20 per cent and an oil and connate-water content of about 2.25 per cent each with inert hot gases at temperatures ranging up to about 1,350° F. leaves about 0.5 per cent residual carbon on the sand. This material constitutes a nonrecoverable residue, but we have found that it can be ignited and is burned at elevated temperature, say upwards of 450° to 500° F., by flow of air or oxygen-containing gas so as to regenerate or revivify the heat-transfer zone in compensation for the dissipation of its heat values resulting during its progress out into the formation.

We have found that this residual carbon represents a valuable fuel for improving thermal recovery if it is burned in such a way as to add its heat values to the heat values put into the formation by burning startup fuel. For we have found that a relatively high temperature, say above about 700° F., is needed to effect practical improvements in oil recoveries after ordinary methods of secondary recovery as by water drive or gas repressuring have reached a point of diminishing return.

Yet the dissipation of heat within the vast underground volume of the formation as the ring of the heat transfer zone is expanded from the input well is large even with closely situated output wells. We have found, however, that we can continuously or intermittently revivify the degenerating heat-transfer wave by burning the residual carbon left in the sand in a relatively narrow band or moving combustion wave that approximately coincides with the moving heat-transfer wave in point of position and rate of movement. For we have discovered that the rate of movement of the combustion wave relative to that of the heat transfer wave primarily depends upon the oxygen content of the driving gases and the residual carbon content of the sands, and that we can obtain the desired coincidence in rate by limiting the oxygen content to a small proportion.

It is important that the relative movement of the peak hot zone and the combustion wave be controlled because otherwise the heat values of each will be independently given up to the structure. Thus if the combustion wave lags behind the heat-transfer wave, the heat generated primarily goes into elevating the temperature of that portion of the formation which has been already swept, and the temperature peak is reduced. If the combustion wave ranges too far ahead of the heat transfer wave, the peak again falls off and finally combustion is lost in the too rich and too cold environment of the outer fringe.

In one method of operating according to our invention, therefore, we include in the cold cycle gas drive up to about 5 to 6 per cent of oxygen. The heat-transfer wave is continuously pro-

jected out into the formation so as to sweep out the oil and is continuously revivified by the recuperative capacities of the cycling gases in picking up preheat from the swept out portions of the formation and then igniting and burning the residual carbon in the sands in the approximate zone of peak temperature.

We have also discovered that we can intermittently revivify the heat-transfer wave by cycling produced gas from outlet wells or other gas of low oxygen content to advance the heat zone until heat losses reduce the frontal temperature to a point somewhat above the ignition termperature of the carbonaceous residue in the sands. At this point we revivify the heat front by introducing sufficient air or other oxygen-containing gas with the cycling gases to reinitiate combustion or raise the combustion level of residual carbonaceous matter in the zone of high temperature so as to replenish the heat content of the frontal area. Large bands of unburned carbon may be left behind, if desired, to avoid overheating the structure in this cyclical method of operation. Thus by skipping bands of residue, control is had on the average per cent residue burned, giving an additional measure of control on the rate of the combustion wave.

Thus, according to our invention, the cold cycling gases entering the inlet well are heated as they move through the zone of previously heated sand, leaving cooler sands behind. Heat is thereby recovered and the heat front is simultaneously advanced, for the regenerated heat is transmitted to the cold sand in front of the previous hot zone. In this manner the high-temperature wave is continuously moved forward, and a heat wave is created within the formation by the heat-transmissive flow of the hot gases followed by the heat-regenerative flow of the cold cycle gases which give up the regenerated heat to the structure in advance of the moving wave front. Since the nonrecoverable carbon residue is left behind the advancing front, it may be burned in a relatively narrow band, forming a combustion wave behind the moving heat wave so that a minimum of recoverable oil is consumed. As the frontal zone progresses in distance from the inlet well, the flow rate may be increased. The flow-rate requirement may be reduced by a limited use of water injection.

We have found that good recovery is effected at operating temperatures within the range of approximately 700° to 1,000° F. Combustion of the residual matter will occur as low as 450° to 500° F. but it is weak, and even at 600° F., the burning band tends to be too broad in area and slow moving for good revivification. In addition, mild cracking begins at about 700° F., reducing the gravity somewhat. Accordingly, we prefer to maintain a temperature above about 700° F., but under the fusion or sintering temperature of the structure, which is ordinarily somewhat above 2,000° to 2,500° F. Ordinarily, incipient sintering below the fusion temperature does not adversely affect permeability.

Oil recovery improves with temperature. For example, the percentage of oil produced from Nowata oil sands of about 20 per cent porosity and 2.25 weight per cent oil content approximates 50 per cent of the oil present at 900° F. under an inert gas flow of about 275 cu. ft. per barrel volume of sand per hour while at 1,350° F. the recovery approximates 90 per cent. Similarly, the desorption of connate water increases with temperature and rate of flow, although the percentage produced is of a significantly lower order under the conditions described.

As a result of applying the methods of our invention, a moving region of high oil saturation is set up ahead of the moving heat front by reason of the greater susceptibility to flow induced by the thermal effects of cracking, vaporization, and viscosity reduction assisted by the "drag" effect of the flowing gas. By cooling and condensation, the gases and oil give up heat to the cooler sands in front of the hot zone so that the progression of the high temperature front is maintained. As the region of oil saturation approaches an outlet well, oil under gas pressure flows or is pumped from the well.

In practicing our invention the high-temperature front is propagated within the formation by burning fuel, conveniently natural gas or crude oil, with air at high temperature either on the surface, or preferably within the hole. The resulting combustion gases under elevated pressure are forced into the porous oil-bearing stratum for a length of time sufficient to raise the temperature of a large body of sand surrounding the well to a temperature below the fusion temperature of the structure but well above the ignition temperature of the residual carbon. At the same time, the formation is partially repressured with resulting flow of cold oil and gas from one or more outlet wells.

During the fuel-burning period, there is normally a large excess of oxygen in the combustion gases because of the use of dilution air in the burner system, which insures clean combustion and prevents the formation of soot that might clog the structure, and additionally assists in heating up the structure by burning carbonaceous residue and some oil.

The use of a bottom-hole burner is advantageous because it eliminates the need for expensive alloy casing and expansion joints. However, the combustion gases may be produced by burning at the surface in any desired type of combustion system producing a stream of hot gas under high pressure or a system combining a surface preheater and bottom-hole burner may be used. With bottom-hole combustion, various ignition schemes may be used, such as electric sparking, thermite, or other incendiary bombs, for example, or an incandescent mantle may be used to assure continuous and uniform combustion. However, a jet-type, spark-ignited combustion system with a high velocity, turbulent air, and gas flow in which a relatively large volume of diluent air gas is introduced progressively into the burning zone provides perhaps the most convenient and reliable bottom-hole system. Recycle gas may be utilized as diluent after the temperature has been built up, and where gas compressors are employed, the compressor exhaust may be utilized as recycle or diluent gas.

EXAMPLE

Besides laboratory flow tube and core tests, as an example of an application in the field, our invention may be illustrated by application to Delaware-Childers field of Nowata County, Oklahoma. This field is underlain by the Bartlesville sand at a depth averaging from 600 to 800 ft.

The oil-bearing sand averages 35 to 40 ft. in thickness and is overlain by impervious cap rock. Although the sand is somewhat lenticular it represents a formation of average or better uniformity. This field has been produced by primary methods, including vacuum, for over 40 years and has been subjected to major gas and air-pressuring projects and, to a minor extent, to water flooding.

Core analysis of the area selected indicates a porosity of approximately 20 per cent and a permeability of 40 millidarcys. The oil content is 300 barrels per acre-foot and the water content, which is entirely connate water, the same. There is very little gas recoverable from the formation.

For the purposes of illustration, an input well for typical 7-in. o.d. pipe is drilled and is reamed and shot with nitroglycerin to expand the hole volume within the sand to a 2 to 3-ft. diameter cavity. In this area wells have been drilled in 5-spot patterns for gas pressuring, so that old wells may be utilized. The well spacing approximates 200 ft. between input and outlet wells and 330 ft.

"... it is a matter of common knowledge that recoveries of oil have rarely exceeded 25 to 40 per cent of the original oil content, and that vast quantities of oil remain in the produced fields of this country and the world."

between like wells. For test purposes all surrounding wells except one which is 230 ft. distant are capped or plugged.

To introduce combustion gas into the formation a high-pressure burner with an elongated combustion chamber is lowered through the well casing to formation level. A suitable burner is disclosed in application Serial No. 97,142 filed June 4, 1949.

The burner comprises an elongated combustion chamber to which fuel gas and primary air are separately introduced through concentric piping by means of a mixing plate at its head. A turbulent tangential motion is imparted to the flame by passage of the fuel gas and air through angularly directed ducts in the mixing plate. The mixture is ignited by a spark plug centrally located in the mixing plate. The burner is constructed of stainless steel or other heat-resistant metal, advantageously in two sections, the combustion, and an upper section containing an inner pipe for gas and a high tension cable leading to the spark plug. For a heat-release rate approximating 500,000 to 600,000 B.t.u. per hour at 40 to 70 psig., the dimensions of the burner advantageously are about 2 in. in diameter by 24 in. in length of each pipe section. The inner gas line and outer air pipe are extended to the surface with ordinary piping, and primary air and fuel gas are supplied in approximately theoretical proportions for perfect combustion. Secondary air to dilute the combustion gases and control the flame temperature is admitted through the oil-well casing around the burner tubing and combustion chamber.

The burner is operated at a flame temperature of about 1,500° F. in the hole and under an inlet pressure of about 360 psig. Fuel is burned at a rate in sufficient quantity for a heat release approximating 500,000 B.t.u. per hour. Sufficient air is provided to control the flame temperature and provide excess oxygen in the fuel gases to accelerate the temperature rise in the formation through internal combustion. A back pressure of about 300 psig. is maintained on the outlet well, and produced gas is recycled to the inlet well after repressuring.

The data on an illustrative example of operation are tabulated below:

Nature of Field:			
Depth to top of oil sands	600'		
Thickness of oil sands	40'		
Well spacing	230'		
Average permeability of oil sands, millidarcys	40		
Residual oil after other recovery methods, wt. per cent of oil sands	2		
Residual carbonaceous solids, wt. per cent of oil sands	0.5		
Conditions of operation:			
Total gas input, std. cu. ft./day/well			480,000
Base pressure level, output gas, #/in.²			300
Input pressure sufficient to maintain gas rate, #/in.² approximately			360
O_2 content of total gas to input well, per cent	1.33	3.33	5.0
Average production, bbl./day/input well	3.2	8.0	12

At the start of operations, fuel is burned with air, and later recycle gas is also included to give temperatures of combustion of about 1,200° to 2,000° F., until about 180,000,000 cu. ft. per well of total gas has been put in. The burner is extinguished and gas drive is now continued without burning extraneous fuel. Under these conditions with an oxygen content of below approximately 1.33 per cent, the heat-transfer wave is in front, and the rate is constant. With above 1.33 per cent oxygen, the combustion wave is in front, travelling at a rate proportional to the oxygen content. But with above about 5 to 6 per cent of oxygen, the fire in front will go out because the temperature is too low to sustain combustion and the oxygen-containing gas will simply be cycled through.

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United States Patents

Number	Name	Date
2,382,471	Frey	Aug. 14, 1945
2,390,770	Barton et al.	Dec. 11, 1945

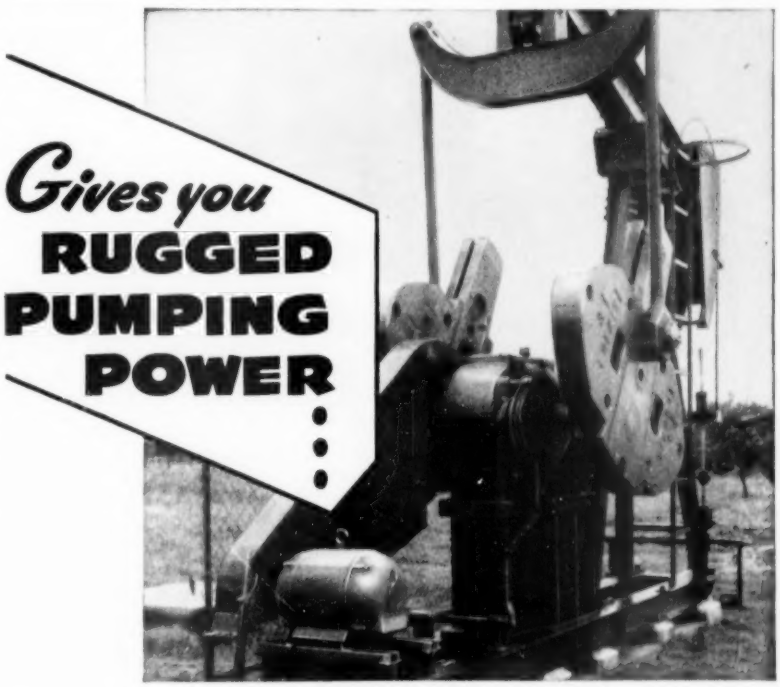
BOOKS

A REVIEW OF THE GEOLOGY AND ACTIVITIES IN THE UINTA BASIN. By A. M. Current, Carter Oil Co., Vernal, Utah. Published as a quarterly of the Colorado School of Mines, Golden. 36 pages and six pocketed plates. 50 cents.

Here is an up-to-date summary of Utah's Uinta basin. It includes discussions on the geology of the basin (Tertiary stratigraphy, structure, and faulting), surface indications of oil and other hydrocarbons, history of development, descriptions of the producing fields, and detailed formation reports on two wells.

PUMPS. By Frank A. Kristal and F. A. Annett. Published by McGraw-Hill Book Co., 330 West Forty-second Street, New York. 375 pp. $6.50.

Here in this second edition of the volume are the A B C's of pumps of many types and designs—a complete, practical treatment that explains what kinds are available, how to select and install them, how to operate and maintain them, how to locate and remedy pump troubles. A wide range of pump applications are discussed, including boiler feed, paper stock, deep-well, sewage and sludge, chemical, food product, oil-field, gasoline-line, fire, corrosive, mine, etc.



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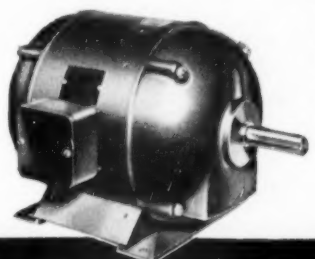

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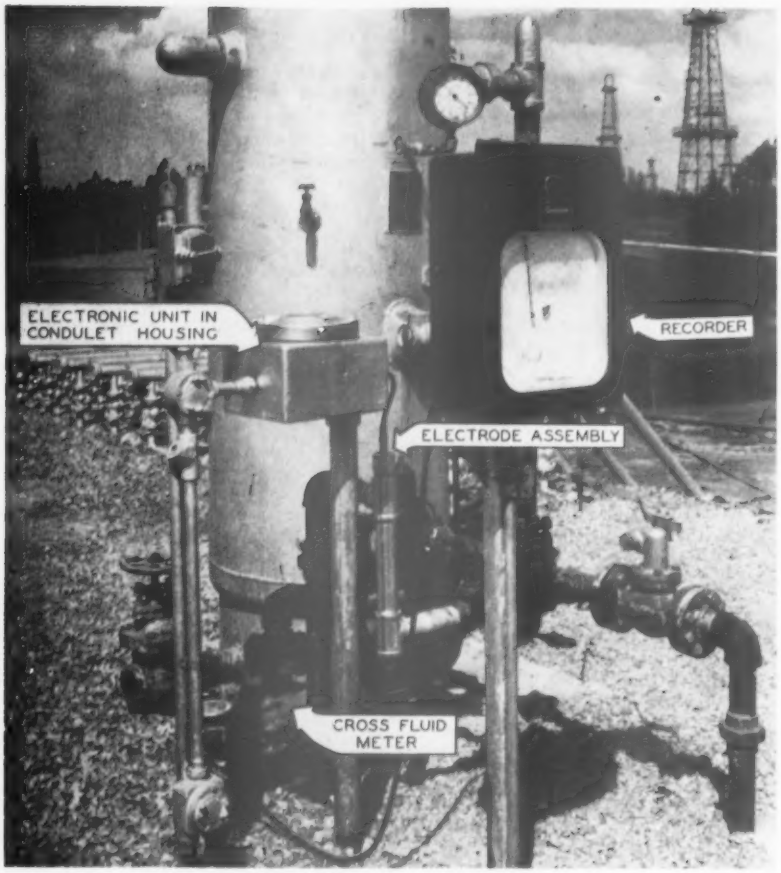

This electronic meter records percentage water cut on a continuous tape or chart, operating on difference in dielectric constants.

Electric Eye Accurately Computes Water Cuts

Percentage of water in oil-well fluids continuously measured and recorded by electronic methods in field test gaging

by R. F. Klassen

MEASUREMENT of oil shipped to a pipe line or otherwise sold from a property has always been accurately measured. It involves a "buy" and "sell" transaction.

But measurements of oil and water mixtures from individual wells, used to help the operator determine how best to produce his well, or wells, do not have this same accuracy requirement. This is because this individual well field gaging is for information only.

In many instances field gaging of individual well production is a time-consuming repetitive operation. If it could be simplified and the accuracy still maintained or improved the time consumed with the present method of gaging could be made available for more important duties.

Extensive tests conducted over a 2-year period at wells of Standard Oil Co. of California in West Coyote field have shown that the percentage water cut of oil-well fluids can be continuously measured and recorded by electronic methods. The accuracy is at least equal to that being obtained by conventional taping and thieving methods.

The new electronic device, used in conjunction with a gas separator and oil-flow meter, checked with similar manual gaging data to an accuracy of about 2 per cent. In obtaining the water cuts by conventional methods, more than usual care was exercised to eliminate errors so that the results are believed to be reasonably conclusive.

Advantage of New Method

The charts plotted by the recorder offer a good indication of a well's pumping characteristics, showing when it pumped off, surged, etc. Less time is required to obtain production figures and cuts than by conventional methods, and necessity for draining gage tanks is eliminated by use of the recorder and meter.

Electronic principles . . . The device, an Enniscope Electronicut meter, measures by electronic methods the percentage of water of the total fluid at any given instant. It records the results in per cent cut on a continuous tape or chart. Sensitivity of the unit is controlled by the contrast in the dielectric constant of the two fluids examined.

Essentially, the device consists of a tuned circuit incorporating a secondary test capacitor which uses the fluid to be tested as its dielectric. As the dielectric of the fluid varies, the capacitor charge varies, detuning the circuit and thus lowering the grid voltage of a 56-92 vacuum tube. This change in grid voltage is consequently amplified by the vacuum-tube effect and is mechanically recorded on the tape or chart.

A special capacitor circuit is inserted to compensate for the nonlinear variations of the dielectric constant with the per cent cut. All variables, i.e., capacitance, circuit voltage, vacuum-tube output, and chart recorder mechanical linkage can be adjusted and operated in their linear ranges.

Since flow of fluid from oil wells may not be constant, which is definitely the case for the pumping wells tested, some type of flow meter must be used so that the readings can be interpreted in terms of total fluid. In the studies made at West Coyote, a conventional oil meter was used to drive the feed mechanism of the continuous tape.

Accuracy of conventional methods . . . Before discussing the results obtained using the electronic recorder, brief mention of the errors encountered in pres-

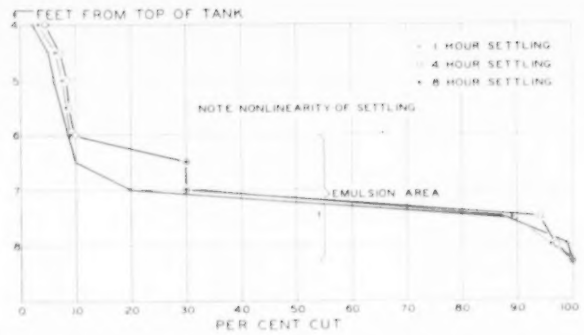

Fig. 1—Results of tests made to check per cent water cut at different settling times.

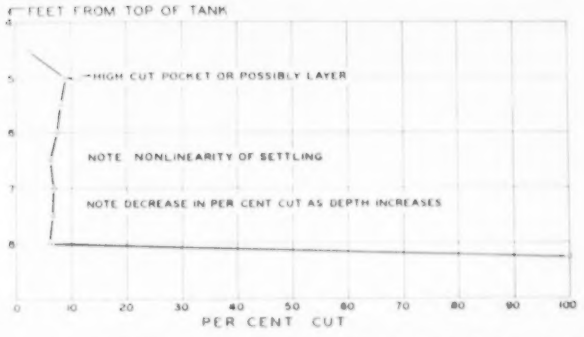
FEET FROM TOP OF TANK
HIGH CUT POCKET OR POSSIBLY LAYER
NOTE NONLINEARITY OF SETTLING
NOTE DECREASE IN PER CENT CUT AS DEPTH INCREASES
PER CENT CUT

Fig. 2—Additional test results made with electronic instrument at different tank depths.

ent field methods of acquiring cut data on an individual well is in order. Likewise, the efforts which were made to reduce these errors within reasonable limits are of interest.

As opposed to accurate measurements of oil for shipping or sale conventional methods of taping and thiefing of oil-well field gage tanks are usually accurate within plus or minus 5 per cent, and sometimes are within plus or minus 2 per cent. Some of the reasons for this range in accuracy are as follows:

1. Inconsistency of manual taping may sometimes be due to the particular individual, sludge on bottom, and bulging of field gage tanks.

2. Inconsistency of thiefing due to the fact no account is made of the per cent cut of any fluid remaining in the tank from the previous individual well gage.

3. Settling characteristics of oil-well fluids. In an 8 or 24-hour period the fluid does not always settle with percentage cuts proportional to the depth, as is commonly expected. This fact generally is ignored in tank thiefing.

To ascertain that such is the case a few tests were made with the electronic instrument by measuring the per cent cut from the top to the bottom of the tank. These limited studies showed: (1) the per cent cut is not always a straight-line variation with respect to depth; (2) high per cent cut pockets, or possibly layers, can exist within the oil layer; and (3) there is not always a definite demarcation between oil, emulsion, and water layers, thus making these boundaries impossible to detect with present electric tapes.

Figs. 1 and 2 show the results of two of the series of tests from which the above observations were made.

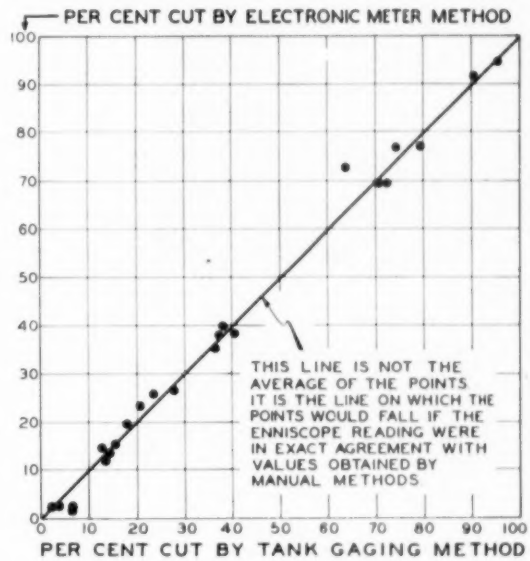
PER CENT CUT BY ELECTRONIC METER METHOD
THIS LINE IS NOT THE AVERAGE OF THE POINTS IT IS THE LINE ON WHICH THE POINTS WOULD FALL IF THE ENNISCOPE READING WERE IN EXACT AGREEMENT WITH VALUES OBTAINED BY MANUAL METHODS
PER CENT CUT BY TANK GAGING METHOD

Fig. 3—Good linearity is shown in plot of electronic meter readings vs. conventional tank gaging.

TABLE I—SUMMATION OF ACCURACY TESTS

Test No.	Well No.	Normal production					Per cent cut present method	Per cent cut electronic method	Per cent variance of electronic method from present method
		Oil	Water	Gas	Gross	Gravity			
1	A	57	47	34	104	28.8	20.9	23.38	+2.48
2	B	198	40	187	237	28.8	14.2	13.34	−0.86
3	C	106	143		249	26.8	79.4	76.95	−2.45
4	D	22	10		32	29.3	18.0	18.76	+0.76
5	E	34	26	100	60	30.4	13.0	14.65	+1.65
6	F	28	31		59	25.8	90.5	91.64	+1.14
*7	G	6	6		12	24.6	40.52	38.67	−1.85
*8	H	54	94		148	29.6	70.8	69.87	−0.93
9	I	198	40	187	237	28.8	15.6	14.79	−0.81
10	J	106	143		249	26.8	95.4	95.0	−0.4
11	K	57	47	34	104	28.8	27.4	26.95	−0.45
‡12	L	32	1		34	29.2	6.6	1.95	−4.65
§13	M	57	1		58	29.6	6.58	2.00	−4.58
†14	N	20	27		47	23.0	71.8	69.52	−2.28
15	O	22	10		32	29.3	23.2	25.6	+2.4
¶16	P	57	1		58	29.6	2.08	2.15	+0.7
17	Q	39	1		40	22.7	36.46	35.14	−1.32
18	R	34	26	100	60	30.4	13.56	12.0	−1.56
†19	S	54	94		148	29.6	64.0	72.85	+8.85
20	T	28	31		59	25.8	74.6	76.87	+2.27
*21	U	6	6		12	24.6	38.23	40.00	+1.77
22	V	39	1		40	22.7	37.83	37.97	+0.14
†23	W	20	27		47	23.0	73.43	69.67	−3.76
24	X	32	1		34	29.2	3.35	2.27	−1.08

Average 2.02 per cent variance.

*Heavy emulsion. †Emulsion, difficulty in finding emulsion and water boundaries. ‡Excessive variance, probably due to errors in thiefing or taping. §Heavy emulsion, indications of high per cent cut pockets. ¶Heavy emulsion, fortunate in estimating emulsion boundaries correctly.

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THE AUTHOR

R. F. Klassen is a production engineer in the southern district of Standard Oil Co. of California, having joined the producing division of the company in 1946. Klassen, an electrical engineering graduate from University of Michigan, has worked on oil-field electrical problems, principally connected with producing operations, throughout this period. Before joining Standard he worked as machinist, tool and die maker, tool-shop foreman, and tool designer. Klassen served with the Army Signal Corps in the South Pacific, 1942-46.

sibilities of these errors in testing the accuracy of the electronic cut recorder several precautions were taken. They did not entirely eliminate the errors of manual gaging of mixed oil and water but it is believed they were reduced to a reasonable limit.

1. All gages were made by the same man in a single tank, with the tape readings being made from the top of the tank instead of the bottom.

2. Depths for theifing were calculated to the inch and the depths were measured before tripping. Also all cuts were taken of the fluid remaining in the tank from previous gages and the final cuts calculated on this basis.

3. Settling characteristics were observed and when indications were such that settling was not normal, an increased number of samples were taken of both the emulsion and oil layers.

4. When preparing the centrifuge tests, extreme caution was exercised in

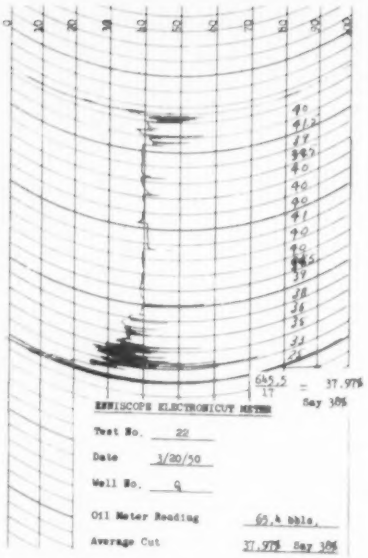

Fig. 5—Record of Test No. 22, Table 1 shows average water cut of 38 per cent, only 1 per cent off from manual gaging.

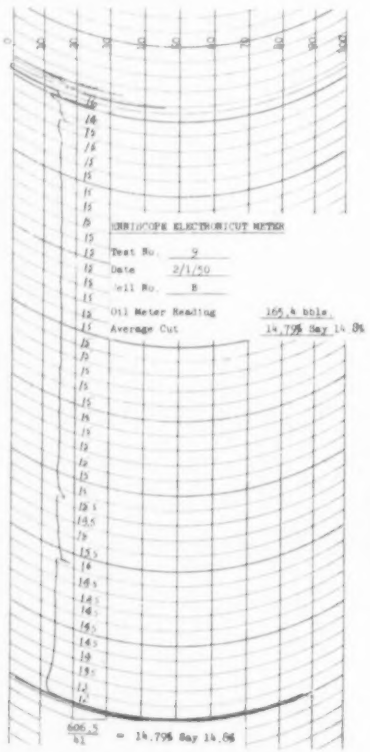

Fig. 4—Example of record (Test No. 9 of Table 1) shows average water cut of 14.8 per cent.

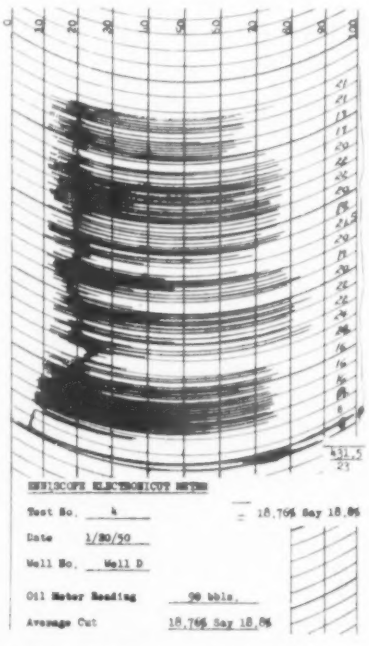

Fig. 6—Instantaneous surging is indicated on this tape record. Record, however, can be averaged with good accuracy.

filling the centrifuge bottles and the final readings were interpolated to the nearest 0.25 per cent.

Results of tests conducted under these conditions are summarized in Table 1. These data show the average percentage of error of the cut recorder, based on comparison with the method of obtaining cuts, was 2.02 per cent, say 2 per cent, with only four readings in excess of 2.5 per cent error.

In the four cases where the error was 2.5 per cent or higher, the well's production usually consisted of bad emulsion—as is noted under the remarks column of the table. Because of the difficulties of determining the exact boundaries of the oil, emulsion, and water, as discussed earlier, it is believed the greatest portion of these errors were due to inaccuracies in gaging.

As for the linearity of accuracy (consistent accuracy throughout entire range), more data are needed in the extreme upper range of cuts before definite conclusions can be reached. However, as is shown in the plot of meter readings versus cut readings (Fig. 3), the indications of linearity are very good. Certainly they are within the required range for field operations.

Interpretation of charts . . . Most of the records obtained, which were tapes although charts now are being used, were of such a nature they could be read at a glance. An example of such a record is shown in Fig. 4 (test No. 9 in the table). Little effort is required to arrive at the answer that the average water cut of the 165.4 bbl. of fluid measured was 14.8 per cent. From the table it is seen that the per cent cut as determined by the manual method was 15.6.

Records in which the cut varies considerably during the test require more study. Such an example is Test 22, shown in Fig. 5. As shown the cut varied from 12 to 45 per cent. At first glance, the average cut might be read at 40 per cent. However, by closer examination, or by averaging the values between each line as was done on the chart, it is found that the average cut is 38 per cent. This average was found to be only 1 plus per cent off from that derived by manual methods.

Another chart difficult to interpret is the case where a well instantaneously surges, causing considerable variation in the tape. A good example of this type is Test 4, shown in Fig. 6.

In reading this tape it should first be noted that the high peaks of the graph are of such short duration that the needle has actually retraced its path back to the lower reading. This would indicate that the fluid flow at these readings was so small as to be conveniently considered zero flow and, consequently, should be ignored.

Keeping this in mind, it can be seen from the heavy lines that the needle has been between the range of 10 and 20 per cent for the greatest part of the time and a definite path can be traced and averaged to be 18.8 per cent. This compared with the modified conventional finding of 18.0 per cent, being 0.8 per cent higher.

It should be noted that if the majority of the wells are of this type the tape or chart speed can be increased by changing gear ratios to produce a more easily read chart.

In addition to these examples of type charts, in some cases a well surges for a definite length of time, causing considerable variation in the tape but plotting a graph of definite nature. Still other charts are obtained which are a variation of two or more of the described types. Whatever the nature of the chart, however, with experience cut readings can be obtained which are as accurate as could be determined by conventional thieving and taping methods.

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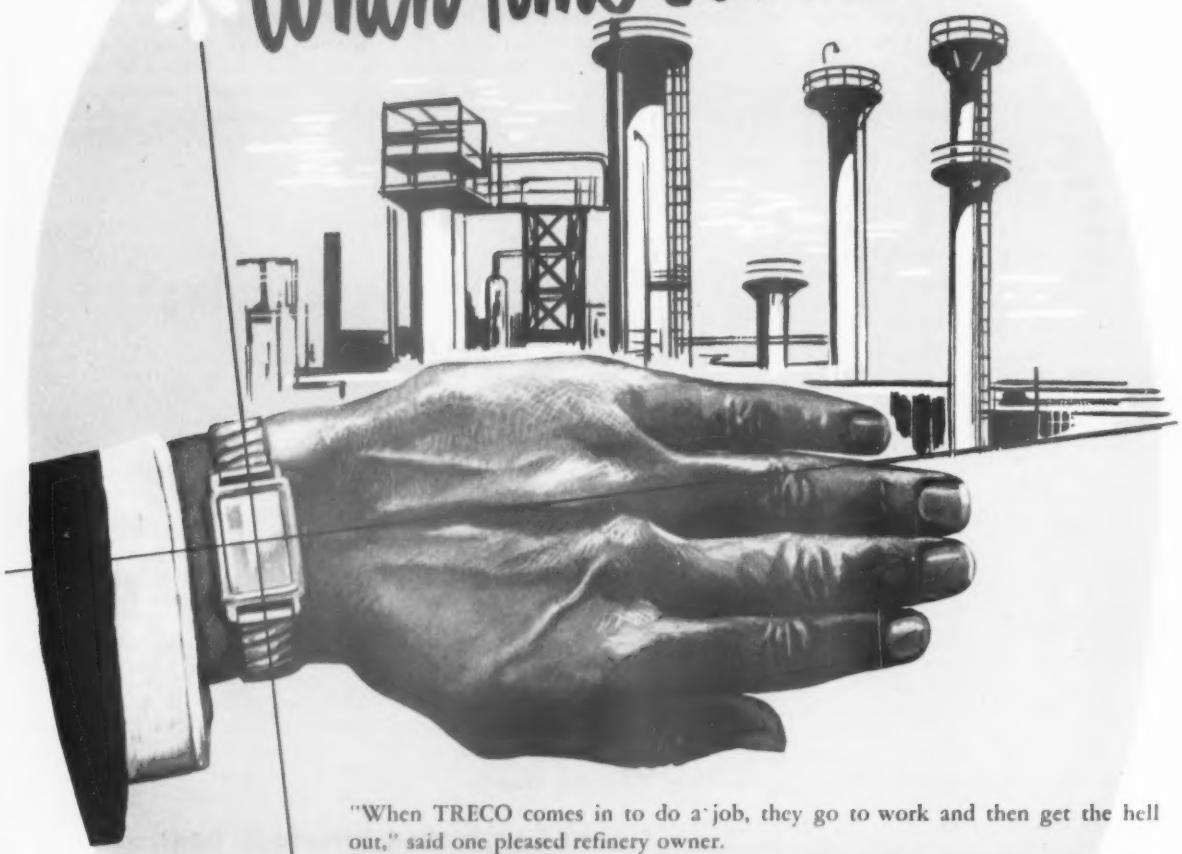

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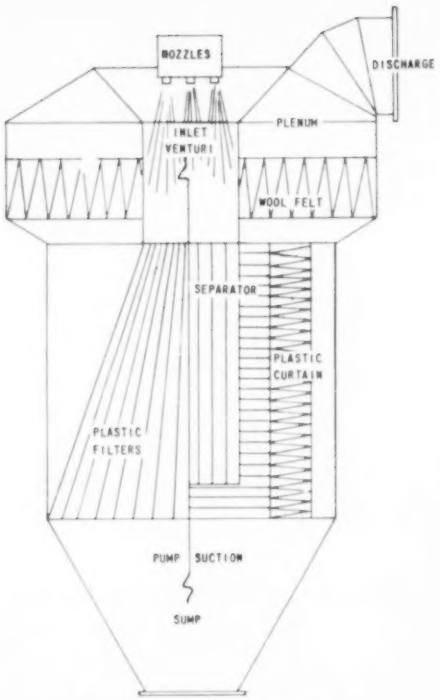

Fig. 1—Evaporative cooling unit.

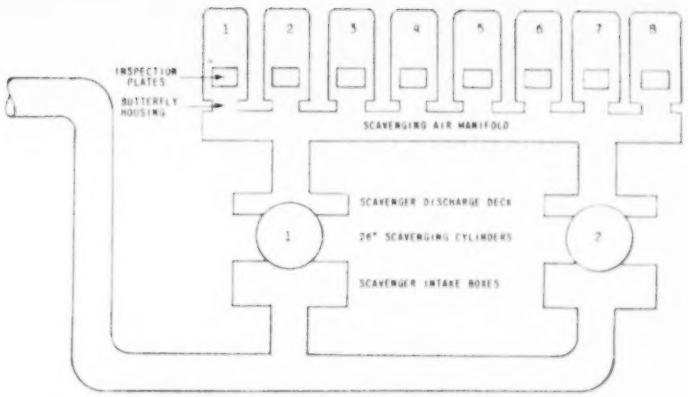

Fig. 2—Engine outline showing scavenging air manifold.

Compressor Detonation Dampened by Cooling Scavenger Air

by F. R. Cramer*

RECENT experiments in the use of evaporative cooling of the scavenging air stream on large, two-cycle gas engines at the Blythe compressor station of Southern Counties Gas Co. have indicated encouraging results in the prevention of detonation in areas where high temperatures are encountered.

The compressors are driven by 10 engines, 7 of which are 1,600-hp. units equipped with 26-in. scavenging cylinders. Typically, the scavenging equipment in the 1,600-hp. units was designed to produce a minimum amount of excess air consistent with performance at acceptance test conditions. This has resulted in sufficient air to satisfy the scavenging demand but not enough excess to produce the cooling effect necessary to prevent detonation during high ambient temperatures and near-capacity load.

In the three-high-compression units, a more generous treatment of the excess air was designed. Sufficient excess air is available to account for some cooling to augment the inherently cooler operation of the higher-compression engine. No detonation has been experienced in these engines at any time.

Complex load . . . The nature of the plant load is such that volume throughput is the operating index. This daily rate remains fairly constant through varying pressure conditions. As a result, any advantage which is experienced due to high suction and/or low discharge pressures must be reconciled to the maximum flexibility of available horsepower. Thus, plant differentials sometimes require operating nine engines at uneconomically low horsepower simply because the pressure conditions will not allow taking off an engine without overloading the remaining eight. From this, it may readily be observed that at those times when such a change could be made, operation would be at marginal top load, and it would then be imperative to exact full capacity from the operating units.

Comparison of an hourly load and throughput on a summer-day log sheet with an identical load and volume hour during the fall or winter show the expected losses very clearly. (See Table 2).

Losses are thus brought about by the mechanics of plant differential, compounded by the seasonal problems of increased gas temperatures, and the limitation of engine load due to detonation. Elimination of detonation during the extremely hot summer months is therefore of prime interest.

Evaporative cooling . . . The evaporative cooling unit selected for trial was an experimental product designed by an independent inventor and fabricated in the most part by a sheet metal shop. It consisted of a vertical cylindrical case at the lower periphery of which was attached an inverted cone which served as the pump suction sump. At the top of the cylinder was secured a rectangular compartment designed to form an annular chamber between the outer shell of the filter case and the wall of the inlet air venturi. (See Fig. 1).

The filter medium consisted of a curtain of hardware cloth flecked with a plastic material, and made up of six pleated segments assembled in the shape of a frustum of a cone, the top of which was radially secured to the exit rim of the venturi chamber, and the lower skirt of which was bolted to the bottom rim of the cylindrical filter case.

Enclosed within this filter curtain was the primary separator. This device was fabricated from the same general material as the cone, but in the shape of six tubular sections of equal length and gradually decreasing diameter, nested one within the other to form a separating maze. The top of this bundle was also fastened radially to the outlet of the venturi, and the lower end suspended a few inches above the normal reservoir level. Cooling was effected in the unit by the passage of air through a spray, the nozzles of which were so placed in the inlet venturi that an aspirating effect was produced. The

*Southern Counties Gas Co. of California. Paper presented at Pacific Gas Association meeting, Santa Barbara, 1953.

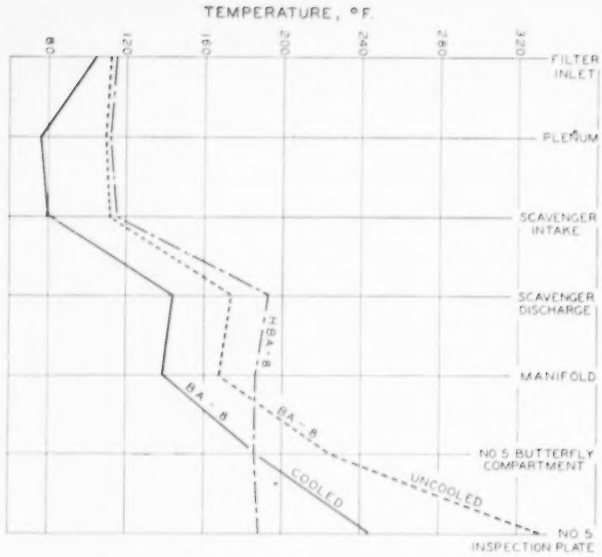

Fig. 3—Air-stream temperatures.

saturated air issued from the separator and was directed by the design of the filter case in an upward direction through the plastic curtain, and thence against wool-felt filters which were located within the annular discharge plenum.

The use of various combinations and capacities of pumps and fans failed to produce any reasonable improvement in the total efficiency of the machine. It was at first hoped that sufficient air could be inspired through the use of a fan to produce a positive pressure at the scavenging air inlet boxes. A 12,700-cu. ft. per minute axial fan was installed atop the filter inlet, but the increase in pressure at the scavenging cylinder intake was negligible, and the idea was abandoned since trials failed to indicate justification for the added equipment.

Cooling results . . . Creditable cooling was accomplished in all the trials, and the temperature depression was reflected throughout the scavenging air stream. Fig. 2 represents a rough outline of the engine. Temperatures were taken at the butterfly-valve housings of two of the power cylinders. The scavenging air-compressor discharges into the manifold directly below No. 2 power cylinder. No. 5 cylinder is most remote from the two scavenging cylinder discharges. The difference in temperature between these two points due to convection was quite noticeable. The final temperatures were taken at the inspection plates on the cylinders proper, and here again, the temperatures reflected absorbed engine heat.

Peculiarly, this is the point on the units where the temperatures ceased to correspond to those of the test engine. In Table 2, note that there is a favorable relation between all temperatures up to the scavenging air manifold, after which the high-compression-engine apparently added no further heat to the air stream. Hence, if it appeared ambiguous to argue the economics of limited excess air and then affirm the nondetonating virtues of the 30-in. scavengers, Table 2 should help to validate the conviction that actual lack of air was not the principal cause of detonation.

All temperatures throughout the cooled scavenging air stream compared favorably with those trials taken on a day of normal ambient and no detonation could be induced up to 1,700 hp. while cooling was in use.

Equipment difficulties . . . With all the success realized in the trials, however, enthusiasm for the cooling unit was short-lived. The first visual inspection disclosed exchange surfaces heavily coated with salts, and the disintegration of the internal parts due to corrosion, mechanical failure of the fasteners, and and fatigue of the materials resulting from the pulsations inherent in the air stream. The mechanical failures could be reduced by beefing up the construction.

The corrosion could be arrested through the use of suitably resistant materials, but it was obvious that scrupulous control of the water condition was going to be essential to continued operation since the rate of concentration was about six cycles in each 24-hour period. The use of additives to increase solubility and inhibit corrosivity was not attempted, principally because of the questionable effect of possible carryover.

The unit has been rebuilt internally, using the same plastic-coated materials fabricated into pleated sections resembling those of the wool-felt construction. Admittedly, this construction is somewhat more rigid and may withstand the stresses of the severe pulsative action. The change of design should not appreciably alter the per-

TABLE 1—COMPARISON OF SUMMER AND WINTER OPERATIONS

	No. 1 Hp.	No. 2 Hp.	No. 3 Hp.
Compressor:			
Aug. 4, 7 p.m.	1,610	1,610	
Nov. 13, 8 p.m.	1,496	1,556	1,556

No. 4 Hp.	No. 5 Hp.	No. 6 Hp.	No. 7 Hp.	No. 8 Hp.	No. 9 Hp.	No. 10 Hp.	Suct.	Disch.	Rate M.M.C.F.D.
1,610	1,610	1,610	1,610	1,670	1,670	1,670	460	793	419
1,556		1,556	1,556	1,556	1,556	1,556	460	793	426

	Dry bulb	Wet bulb	R. H.	Inlet gas temperature
Aug. 4, 7 p.m.	92° F.	78° F.	.55	87° F.
Nov. 13, 8 p.m.	58° F.	49° F.	.52	70° F.

TABLE 2—SCAVENGING AIR TEMPERATURE TESTS

	No. 10 engine		
	June 20, 2 p.m.	June 21, 4 p.m.	
Temperatures at:			
Filter intake, °F.	114	78	112
Plenum chamber, °F.	112	76	111.5
No. 1 intake box, °F.	113	78	112
No. 2 intake box, °F.	114	78	112
No. 1 scavenger discharge, °F.	188	154	175
No. 2 scavenger discharge, °F.	193	154	176
Scavenging air manifold, °F.	186	153	178
No. 2 Cyl. butterfly housing, °F.	188	155	208
No. 5 Cyl. butterfly housing, °F.	186	158	224
No. 2 Cyl. inspection plate, °F.	188	154	269
No. 5 Cyl. inspection plate, °F.	188	156	331
Pressures			
Filter plenum, in. H_2O	0	0	0
No. 1 intake box, in. H_2O	—4.0	—3.75	—2
Scavenging air manifold, in. Hg	7.5	7.4	7
Operating horsepower	1,706	1,614	1,624
R.p.m.	300	300	300
Dry-bulb temperatures, °F.	104	70	109
Wet-bulb temperatures, °F.	68	58	75
R. H.	.14	.48	.20
Pump discharge pressure	(*)	(*)	(*)

*Not taken.

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formance of the machine, but more tests will be conducted.

Judicious application of the outlined materials and construction changes should correct the principal deficiencies of the machine. The continuous removal, redesign, and addition of internal parts has involved a great deal of "make - fit" alteration which leaves something to be desired in a finished product.

Its function as a filter would, of course, require spectroscopic tests of the air stream to determine its performance in the removal of air-borne solids. Also, the question arises whether it would be desirable to operate the filter on a water cycle for those months of the year when the necessity for cooling was not indicated.

Want to Lease From Uncle Sam?

(Continued from page 102)

provide an auxiliary mud pit or tank and maintain a supply of mud of the proper characteristics for emergency use in case of blowouts or lost circulation.

221.27—The lessee shall drill substantially vertical wells, material deviation from the vertical being permitted only on written approval of the supervisor and where interests in other properties will not be unfairly affected.

Subsequent regulations require that water be shut off from productive strata, tests for commercial productivity be made on formations giving evidence of oil or gas, upper productive strata be protected before deepening wells, precautions be taken against the blowing of wells and maintenance of wells to prevent the formation of emulsion and infiltration of water. They deal also with pollution, gaging, and storing of oil and abandonment of useless wells.

221.35—The lessee is obligated to prevent the waste of oil or gas, and to avoid physical waste of the latter must either consume it beneficially, market it, or return it to the productive formation. If waste of gas occurs, the lessee must pay the full value at a price not less than 5 cents per 1,000 cu. ft. unless the waste, under the particular circumstances involved, is found by the secretary to be sanctioned by the laws of the United States and of the state in which it occurs.

"Production of oil and gas shall be restricted to such amount as can be put to beneficial use with adequate realization of values, and in order to avoid excessive production of either oil or gas, when required by the secretary, shall be limited by the market demand for gas or by the market demand for oil."

Sections 221.36 to 221.41 deal with accident prevention, workmanlike operations, sales, and royalty payments.

Detailed reports are required on all operations, on forms provided for the purpose, as follows:

Form 9-329, to be filed monthly in duplicate, reporting all operations conducted on each well during each month, the status of operations on the last day of the month, and a general summary of the status of operations on the leased lands, showing the number of days each well produced, whether oil or gas, and the number of days each input well was in operation; the quantity of oil, gas and water produced, the total amount of gasoline and other lease products recovered; the depth of each active or suspended well and the name, character, and depth of each formation drilled during the month, the date each such depth was reached, the date and reason for every shutdown, the names and depths of important formation changes and contents of formation, the amount and size of any casing run since the last report, and dates and results of any tests such as production, water shutoff or gasoline content, and sales of oil and gas.

Form 9-361, to be filed monthly in duplicate, showing each run of oil, all sales of gas, gasoline, and other lease products, and the royalty accruing therefrom.

No formal transmittal letter is used for the remittance of royalties from public-lands leases. Many operators include their remittance with their Form 9-361 report.

Although there is some question whether operators on government lands are amenable to the conservation laws of the states, and government lawyers believe it is not necessary for them to conform to state allowables, the department has never formally ruled to that effect and operators generally conform to state requirements where they are applicable.

The department itself, however, insists on efficient operation and prevention of waste. In cases where lessees wish to unitize their operations or the department deems it necessary, a unit plan can be worked out under the supervision of the Geological Survey, and a suggested standard form of agreement has been developed.

Form 9-331a, to be filed in triplicate, is used for a number of specified purposes and may be used for others not specifically designated, including:

Notice of intention to drill, showing the proposed location and altitude of the ground and derrick floor above sea level and the geologic name of the surface formation, and an outline of

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the proposed drilling and casing plan, including types of tools, proposed depth to which the well will be drilled, estimated depths to the top of important markers, estimated depths at which water, oil, gas, and mineral beds are expected, the proposed casing record, including the size and weight of casing, the depth at which each string is to be set, and the amount of cement and mud to be used. Information must also be given relative to the drilling plan, such as making drill-stem tests, drilling in with oil, using reversed circulation, perforating opposite pays, using special types of mud in rotary drilling, coring at specified depths, using electric logging, etc.

Notice of intention to change plans, where unexpected conditions prevent following plans shown in the intention to drill.

Notice of date for casing and water shut-off test. Such tests must be approved before further drilling can proceed.

Subsequent report of casing and water-shutoff test, to be filed within 15 days, giving complete and accurate details, amount of mud and cement used, lapse of time between running and cementing the casing and making the test, method of testing and results.

Notice of intention to redrill, repair, or condition well, to be filed and approved before work is started. In work that affects only rods, pumps, or tubing, or other routine work such as cleaning out to previous total depth, no report is necessary unless ordered by the supervisor.

Subsequent report of redrilling, repairing, or conditioning, to be filed within 15 days after completion of the work, showing the amount of production of oil, gas, and water both before and after the work is done and a complete statement of the work accomplished and methods used.

Notice of intention to use explosive or chemicals, whether for increasing production or in drilling, repair, or abandonment. Separate notice is not required where shooting or acidizing is shown in a notice of intention to redrill, repair, or abandon.

Subsequent report on shooting or acidizing, to be filed within 15 days, showing the amount and nature of the material used, its exact location and distribution in the well by depths and the method used to localize its effects, together with information on daily production before and after the work.

Notice of intention to pull, perforate, or otherwise alter casing, giping full details of the contemplated work and the results anticipated.

Subsequent report of pulling, perforating, or otherwise altering casing, to be filed within 15 days, showing what was done and the results obtained, including any change in production.

Notice of intention to abandon well, showing the reason for abandonment, to be accompanied by a complete log, in duplicate, of the well to date if the log has not been filed previously, and giving full details of the proposed work, including information as to kind, location, and length of plugs, by depths, and plans for mudding, cementing, shooting, testing, and removing casing.

Subsequent report of abandonment, to be filed within 15 days, giving a detailed account of the manner in which the abandonment or plugging work was carried out, including the nature and quantities of materials used in plugging and the location and extent of the plugs of different materials; records of any tests or measurements made and of the amount, size, and location by depths of casing left in the well, a detailed statement of the volume of mud used and the pressure attained in mudding.

Form 9-330, to be filed in duplicate within 15 days after the completion of each well to give a complete and accurate log and history, in chronologic order, of all operations conducted on the well. If a log is compiled for geologic information from cores or formation samples, duplicate copies must be filed in addition to the regular log, as well as duplicate copies of all electric logs, temperature surveys or direction surveys.

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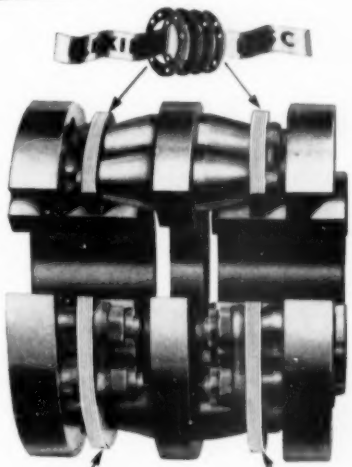

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How Petroleum Hydrocarbons Are Named

Ever since Kekule dreamed up the benzene ring, there have been questions concerned with hydrocarbon nomenclature. Various systems for naming hydrocarbons have been proposed. This has been a source of confusion to petroleum chemists and engineers. Many an argument has centered around, "Which system shall be used?" Growth of the petrochemical industry serves to focus attention once more on this question. Here in concise form are recommendations for an orderly approach to hydrocarbon nomenclature.

by Mary Alexander*

THE present high level of activity in the petrochemical field brings the petroleum industry face to face with a problem—how to name the various pure chemicals extracted from petroleum, either for end use as such or for petrochem feed stock.

The Journal recently has brought chemists and research chemical engineers up to date on current developments in this field (article by Miss Alexander in issue of July 27, page 341). The purpose of the present article is to review the whole subject of hydrocarbon nomenclature, briefly but completely, for the man who is interested in petrochemical processing from the production standpoint, rather than from the research standpoint.

Straight-Chain Hydrocarbons

The names of the first four normal hydrocarbons, as evolved by common usage, are well established in systems of nomenclature. Names for those having five or more carbon atoms are derived from Greek numerals. However, the Latin-derived nonane and undecane are used for the 9 and 11-carbon compounds through sanction to common usage. The prefix *n* may be used for clarity, ex. *n*-butane, *n*-heptane. However, the names without the prefix should never be used for mixtures or compounds of indefinite structure.

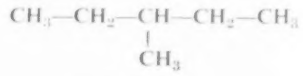
Examples:

CH_4	Methane
$CH_3—CH_3$	Ethane
$CH_3—CH_2—CH_3$	Propane
$CH_3—(CH_2)_2—CH_3$	Butane
$CH_3—(CH_2)_3—CH_3$	Pentane
$CH_3—(CH_2)_4—CH_3$	Hexane
$CH_3—(CH_2)_5—CH_3$	Heptane
$CH_3—(CH_2)_6—CH_3$	Octane
$CH_3—(CH_2)_7—CH_3$	Nonane
$CH_3—(CH_2)_8—CH_3$	Decane
$CH_3—(CH_2)_9—CH_3$	Undecane
$CH_3—(CH_2)_{10}—CH_3$	Dodecane

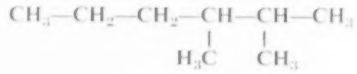
Branched-chain hydrocarbons are named as derivatives of straight-chain compounds. The longest normal chain is used as parent. When more than one name results, selection is made on the basis of simplicity or the chain which admits the maximum number of substitutions. Chemical Abstracts selects its names on the basis of maximum substitution because choice on the basis of "simplicity" could lead to more than one name as it depends on opinion.

The substituents are named either in the order of their complexity or in alphabetic order. Chemical Abstracts selects the alphabetic order because there is no prescribed order of complexity and opinion as to "complexity" differs. Positions of substituents are designated by arabic numerals, the rule of "lowest numbers" being followed. The expression "lowest numbers" signifies individual numbers not the lowest sum of numbers. Thus 1,5,5 is considered lower than 2,2,6.

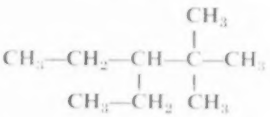
Examples:



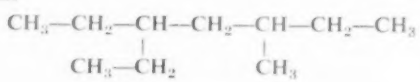
3-Methylpentane



2,3-Dimethylhexane



2,2-Dimethyl-3-ethylpentane
(Chemical Abstracts)
or
3-*tert*-Butylpentane



3-Ethyl-5-methylheptane
(Chemical Abstracts—Alphabetic)
or
3-Methyl-5-ethylheptane (Complexity)

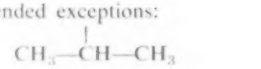
Univalent radicals . . . Univalent radicals are formed by replacing the **ane** ending of the hydrocarbon with **yl.** The carbon atom at the free valency is numbered 1. In the case of branched-chain radicals, certain unambiguous names sanctioned by usage are used.

*Assistant to director of research, Universal Oil Products Co., Des Plaines, Ill.

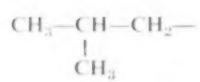
Examples:

Hydrocarbon	Radical	Formula
Methane	Methyl	CH_3-
Pentane	Pentyl	$\overset{5}{CH_3}-\overset{4}{CH_2}-\overset{3}{CH_2}-\overset{2}{CH_2}-\overset{1}{CH_2}-$
2-Methylheptane	6-Methylheptyl	$\overset{7}{CH_3}-\overset{6}{CH}(\overset{1}{CH_3})-\overset{5}{CH_2}-\overset{4}{CH_2}-\overset{3}{CH_2}-\overset{2}{CH_2}-\overset{1}{CH_2}-$

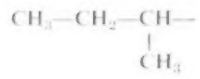
Recommended exceptions:



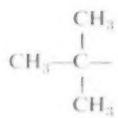
Isopropyl



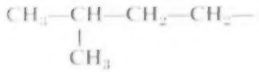
Isobutyl



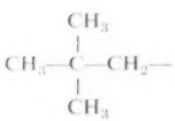
sec-Butyl



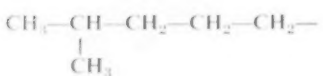
tert-Butyl



Isopentyl



Neopentyl



Isohexyl

Polyvalent radicals . . . Bi and trivalent radicals formed by the removal of hydrogen atoms from a single carbon atom have the endings **ylidene** or **ylidyne** respectively. The only recognized exception is for the one-carbon radical, $-CH_2-$, which is named methylene.

Examples:

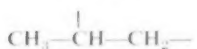
Ethylidene	$CH_3-CH=$
Ethylidyne	$CH_3-C\equiv$
Isopropylidene	$CH_3-\overset{\|\|}{C}-CH_3$

Bivalent radicals formed by removal of hydrogen from two different carbon atoms are named as multiples of **methylene** with the exceptions of **ethylene** and **propylene.**

Examples:

$-CH_2-CH_2-$

Ethylene



Propylene

$-CH_2-CH_2-CH_2-CH_2-$

Tetramethylene

$-CH_2-CH_2-CH_2-CH_2-CH_2-CH_2-$

Hexamethylene

Olefins

Alkene names are derived from the same roots as alkanes, the ending **ene** being used in place of **ane.** The only recognized exception to systematic naming is **ethylene.** In naming branched alkenes, the longest possible chain containing the double bond is chosen as parent and the double bond is assigned the lowest possible number.

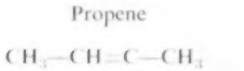
Examples:

$CH_2=CH_2$

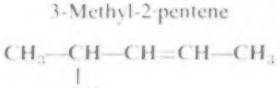
Ethylene (preferred to ethene)

$CH_2=CH-CH_3$

Propene



3-Methyl-2-pentene



4-Methyl-2-pentene

The names of aliphatic hydrocarbons having two or more double bonds are derived from the same roots as are alkenes and alkanes, the appropriate endings **adiene, atriene,** etc., being used in place of **ane** and **ene.** As with alkenes, the double bonds have priority over substituent groups in numbering. There are three recognized exceptions to systematic naming: allene, isoprene, and piperylene, which may be used for the unsubstituted compounds only.

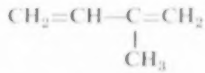
Examples:

$CH_2=C=CH_2$

Allene (preferred to propadiene)

$CH_2=CH-CH=CH_2$

1,3-Butadiene



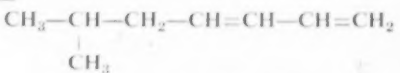
Isoprene (preferred to 2-methyl-1,3-butadiene)

$CH_3-CH=CH-CH=CH_2$

Piperylene (preferred to 1,3-pentadiene)

$CH_2=CH-CH=CH-CH=CH_2$

1,3,5-Hexatriene



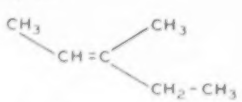
6-Methyl-1,3-heptadiene

$CH_2=CH-CH=CH-CH=CH-CH=CH_2$

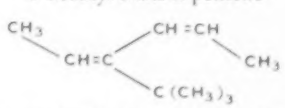
1,3,5,7-Octatetraene

Geometric isomers . . . The isomerism resulting from a given double bond is designated by the prefix *cis* or *trans* according to whether the carbons of the fundamental chain which are adjacent to the carbons of the double bond are on the same or opposite sides of the double bond. Each prefix (*cis* or *trans*) is placed immediately before the number locating the respective double bond.

Examples:



3-Methyl-*trans*-2-pentene



3-*tert*-Butyl-*cis*-2,*cis*-4-hexadiene

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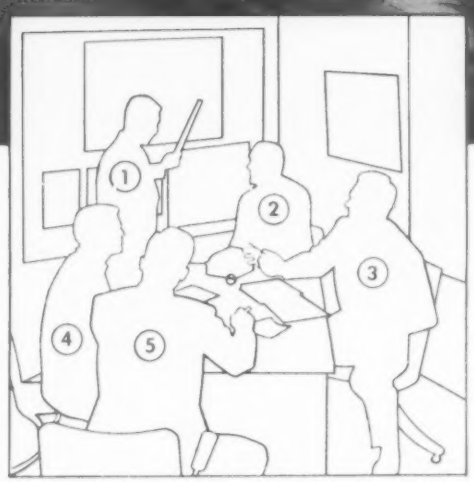

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Charlotte 1, N. C.	5-3731	Los Angeles 17, Cal.	MAdison 6-3881				
Chattanooga 2, Tenn.	7-4361	Louisville 2, Ky.	CLay 0212				
Chicago 54, Ill.	WHitehall 4-3860	Madison 3, Wis.	5-4868				
Cincinnati 2, Ohio	GArfield 2250	Medford, Ore.	2-8289				
Cleveland 13, Ohio	CHerry 1-7600	Memphis 3, Tenn.	8-8546				
Columbia, S. C.	3-8823	Miami 4, Fla.	2-1553				
Columbus 15, Ohio	MAin 5527	Milwaukee 2, Wis.	DAly 8-1800				
Corpus Christi, Tex.	3-9237	Minneapolis 13, Minn.	GRanville 3545				
Dallas 1, Tex.	RIverside 5231	Mobile, Ala.	8-5443				
Davenport, Ia.	3-2761	Nashville 3, Tenn.	42-3505				
Dayton 2, Ohio	ADams 9153	Newark 2, N. J.	MArket 2-0200				
Denver 2, Colo.	KEystone 8121	New Haven 10, Conn.	5-3191				
Des Moines 8, Iowa	2-0244	New Orleans 13, La.	RAymond 8656				
Detroit 31, Mich.	TRinity 2-7010	New York 5, N. Y.	WHitehall 3-4321				
Duluth 2, Minn.	7-1541	Niagara Falls, N. Y.	9700				
El Paso, Tex.	2-5691	Norfolk 10, Va.	5-1639				
Emeryville 8, Cal.	OLympic 2-3770	Oklahoma City 2, Okla.	REgent 6-1633				
Erie, Pa.	24-867	Omaha 2, Nebr.	HArney 8700				
Evansville 8, Ind.	5-7146	Peoria 3, Ill.	2-5439				
Fairmont, W. Va.	501	Philadelphia 4, Pa.	EVergreen 2-1200				
Fergus Falls, Minn.	4250	Phoenix, Ariz.	4-3158				

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Radicals . . . Univalent radicals are regularly formed by substituting the endings **enyl, adienyl,** etc., for **ene, adiene,** etc. There are a few preferred exceptions to systematic names.

Examples:

$CH_2=CH—$

Vinyl (preferred to ethenyl)

$CH_2=CH—CH_2—$

Allyl (preferred to 2-propenyl)

$CH_2=\overset{|}{C}—CH_3$

Isopropenyl

$CH_2=\underset{|}{C}—CH_2—$
CH_3

Methallyl (preferred to 2-methylallyl)

$CH_3—CH=CH—CH_2—$

2-Butenyl

$CH_2=CH—CH=CH—$

1,3-Butadienyl

$C_{10}H_{17}—$

Geranyl (preferred to 3,7-dimethyl-*trans*-2,6 (or 7)-octadienyl)

$C_{10}H_{17}—$

Linalyl

$C_{10}H_{17}—$

Neryl (preferred to 3,7-dimethyl-*cis*-2,6 (or 7)-octadienyl)

$C_{20}H_{39}—$

Phytyl (preferred to 3,7,11,15-tetramethyl-2-hexadecenyl)

Polyvalent radicals formed by the removal of hydrogen atoms from a single carbon atom are formed by adding the endings **idene** or **idyne** to the univalent radical name.

Examples:

$CH_2=C=$

Vinylidene (preferred to ethenylidene)

$CH_3—CH_2—CH=CH—CH=$

2-Pentenylidene

$CH_3—CH_2—CH=CH—C\equiv$

2-Pentenylidyne

$CH_2=CH—CH=CH—CH=$

2,4-Pentadienylidene

Bivalent radicals formed by the removal of hydrogens from two different carbon atoms are named by adding the ending **ene** to the univalent radical name.

Examples:

$—CH=CH—$

Vinylene (preferred to ethenylene)

$—CH_2—CH=CH—$

Propenylene

$—CH_2—CH=CH—CH_2—$

2-Butenylene

Acetylenic Hydrocarbons

Hydrocarbons containing triple bonds are named from the same roots as the alkanes and alkenes. The appropriate ending **yne, diyne,** etc., is used in place of **ane** or **ene.** The recognized exception to systematic naming is acetylene.

Examples:

$CH\equiv CH$

Acetylene (preferred to ethyne)

$CH_3—C\equiv C—CH_3$

2-Butyne

$CH_3—C\equiv C—CH_2—C\equiv CH$

1,4-Hexadiyne

$CH_3—\underset{|}{CH}—CH_2—C\equiv CH$
CH_3

4-Methyl-1-pentyne

Radicals . . . Radicals are formed by the same rulings which apply to alkenes. The two-carbon radical is regularly formed.

Examples:

$CH\equiv C—$

Ethynyl

$CH_3—CH_2—C\equiv C—$

1-Butynyl

$CH_3—CH_2—C\equiv C—CH=$

2-Pentynylidene

$—CH_2—CH_2—C\equiv C—CH_2—$

2-Pentynylene

Compounds having both double and triple bonds are named from the same roots as alkanes, alkenes, etc., with the endings **enyne, dienyne,** etc. When there is a choice in numbering, double bonds are given the lowest numbers.

Examples:

$CH_3—C\equiv C—CH_2—CH=CH_2$

1-Hexen-4-yne

$CH\equiv C—CH=CH—CH=CH_2$

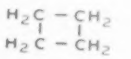
1,3-Hexadiene-5-yne

$CH_2—CH_2—CH_3$
$|$
$CH\equiv C—\underset{|}{C}=C—CH=CH_2$
$|$
$CH_2—CH_2—CH_3$

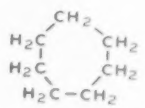
3,4-Dipropyl-1,3-hexadien-5-yne

The monocyclic alicyclic hydrocarbons have the names of the corresponding open-chain compounds, preceded by the prefix **cyclo** except for the menthane series of terpenes which are given terpene names.

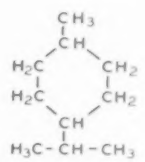
Examples:



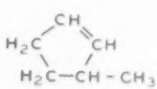
Cyclobutane



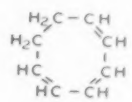
Cycloheptane



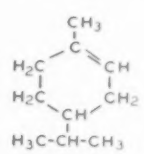
p-Menthane (An exception: Terpene name)



3-Methyl-1-cyclopentene



1,3,5-Cyclooctatriene



Limonene (C.A. index name) (An exception: Terpene name)

1,8,(9)-*p*-Menthadiene (C.A. cross reference)

1,8-*p*-Menthadiene (Grafflin name)

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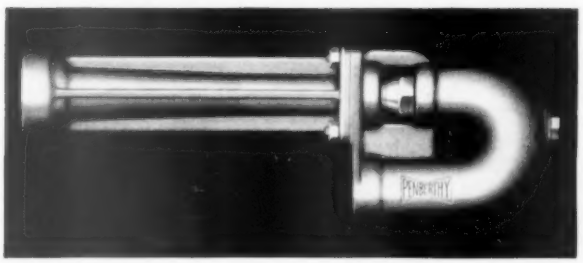

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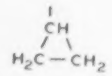
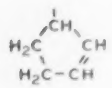
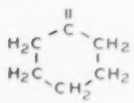


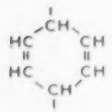
Cyclopropyl



2-Cyclopentenyl



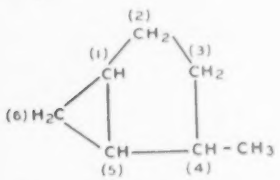
Cyclohexylidene



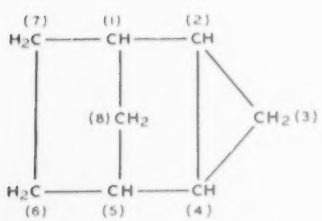
2,5-Cyclohexadien-1,4-ylene

Bridged-ring hydrocarbons . . . Bridged-ring hydrocarbons are named by the Baeyer system except for those classified as terpenes. In Baeyer names, the parent is the same as the corresponding open-chain compound preceded by the appropriate prefix **bicyclo** or **tricyclo** and numbers in brackets to denote the number of carbons in each bridge. For bicyclic hydrocarbons the numbers in the brackets denote, respectively, the number of carbon atoms in the right bridge, the left bridge, and the middle bridge. For tricyclic compounds a fourth number is added for the fourth bridge, the bridge ends of which are indicated by superscripts.

Examples:

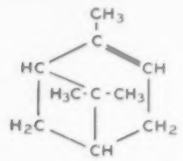


4-Methylbicyclo[3,1,0]hexane

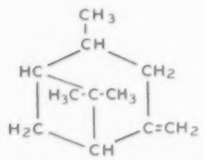


Tricyclo[3,2,1,$0^{2,4}$]octane

Examples of terpene exceptions:



α-Pinene (Classic name)
2-Pinene (Grafflin name)

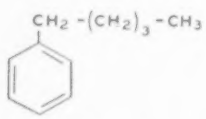


Homoverbanene (Classic name)
4-Methylenepinane (Grafflin name)

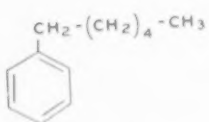
Benzene and derivatives . . . The name **benzene** is used for the monocyclic aromatic hydrocarbon. The radical derived therefrom is named **phenyl.**

Aliphatic derivatives are named either by (1) prefixing the names of side chains to benzene or (2) prefixing the radical phenyl to the name of the aliphatic hydrocarbon. The first method is preferred when short or multiple side chains are present and the second when the aromatic residue is not at the end of the chain or the chain is unsaturated. Chemical Abstracts makes exceptions in the cases of ethynylbenzene, allylbenzene and propenylbenzene. Trivial names are preferred for a few compounds. Alicyclic derivatives are treated similarly.

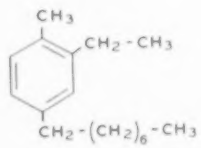
Examples:
Regularly formed:



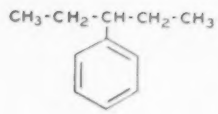
Pentylbenzene



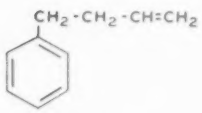
1-Phenylhexane



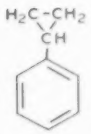
1-Methyl-2-ethyl-4-octylbenzene



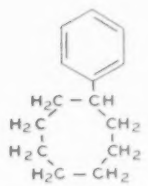
3-Phenylpentane



4-Phenyl-1-butene

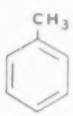


Cyclopropylbenzene

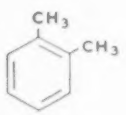


Phenylcyclooctane

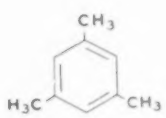
Trivial names preferred:



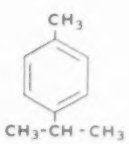
Toluene



o-xylene
(also *m* and *p*)



Mesitylene



p-Cymene

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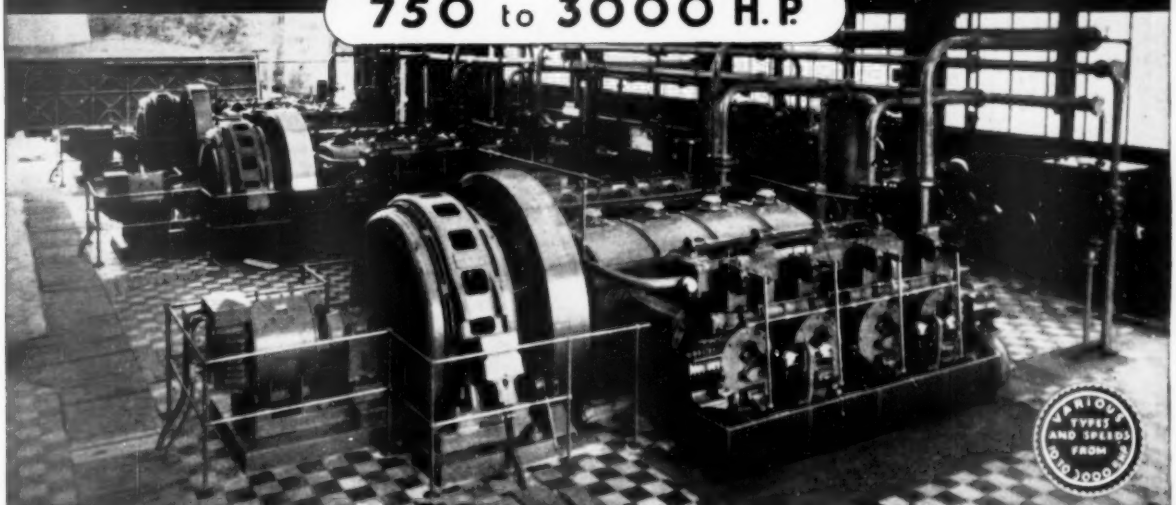

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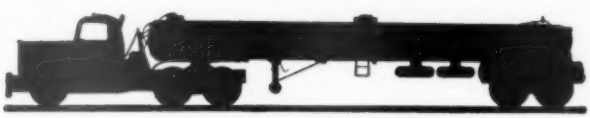
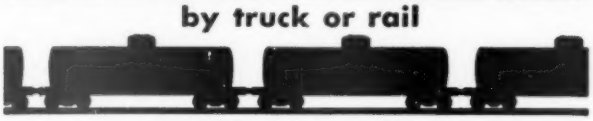


by truck or rail



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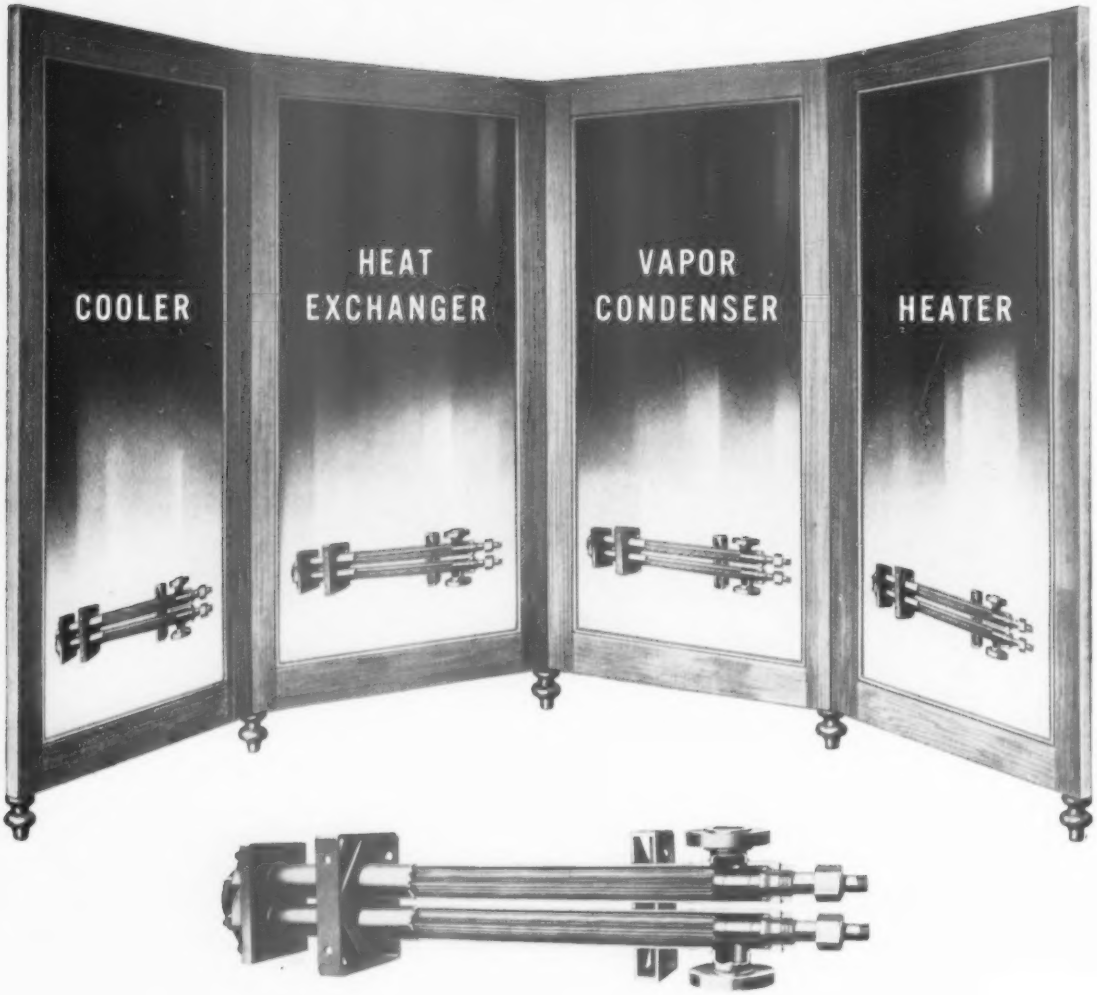

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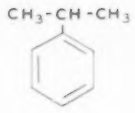
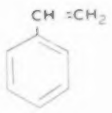


Cumene

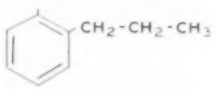


Styrene

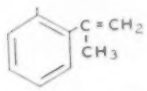
Radicals formed by removal of hydrogen from a ring carbon atom are named as substituted phenyl groups with a few specified exceptions.

Examples:

Regularly formed

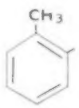


2-Propylphenyl

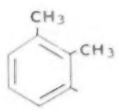


2-Isopropenylphenyl

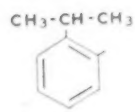
Exceptions



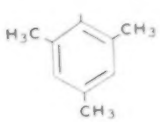
o-Tolyl
(also *m* and *p*)



2,3-Xylyl
(also other
xylyls)



o-Cumenyl
(also *m* and *p*)

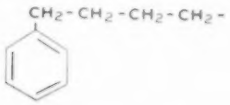


Mesityl

Radicals formed by removal of hydrogen from the side chain are named as phenyl derivatives of the aliphatic radical with certain specified exceptions.

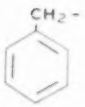
Examples:

Regularly formed

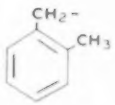


4-Phenylbutyl

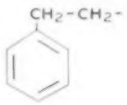
Exceptions



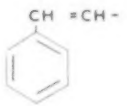
Benzyl



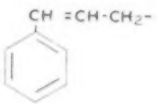
o-Methylbenzyl
(also *m* and *p*)



Phenethyl



Styryl

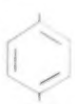


Cinnamyl

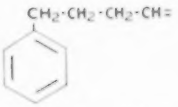
Radicals formed by elimination of two hydrogens from different ring carbon atoms are named phenylene or as derivatives thereof. Radicals formed by elimination of two or more hydrogens from a carbon in the chain or two hydrogens from different chain carbon atoms are named similarly to aliphatic radicals. There are a few recognized exceptions.

Examples:

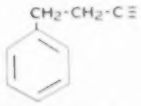
Regularly formed



Phenylene

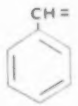


4-Phenylbutylidene

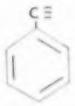


3-Phenylpropylidyne

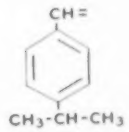
Exceptions



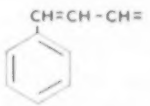
Benzylidene



Benzylidyne



4-Isopropylbenzylidene
(also other derivatives)



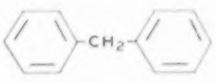
Cinnamylidene

Compounds Containing Two or More Benzene Rings

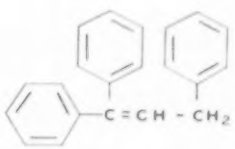
Compounds with two or more benzene rings attached to an aliphatic chain or alicyclic ring are named as derivatives of the aliphatic or alicyclic residue. A few recognized exceptions are used by Chemical Abstracts.

Examples:

Regularly formed



Diphenylmethane



1,1,3-Triphenyl-1-propene

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Many major oil refining companies throughout England, on the Continent, and in South and Central America have standardized on Flexibox mechanical seals for their process pumps. Write for Bulletin 9. Sealol Corporation, 15 Willard Avenue, Providence 5, Rhode Island. Chicago • Cleveland • Houston • Los Angeles Philadelphia • Tulsa • Montreal, Canada. Flexibox, Ltd., Manchester, England.

OPERATING PRINCIPLE OF FLEXIBOX SEALS

The spring ❶ engages the shaft sleeve ❷ at one end and the neck of the rotary seal ring ❸ at the other with interference fits. In operation the coils tend to "wind up", thus further increasing their grip. Consequently, the rotary seal ring ❸ is driven positively yet resiliently.

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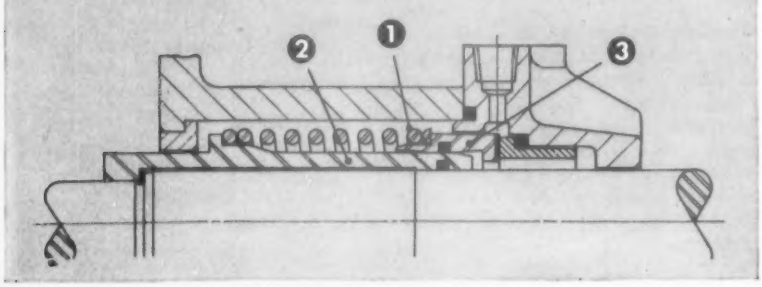

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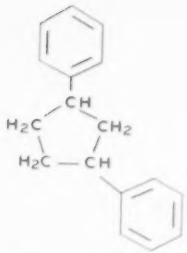
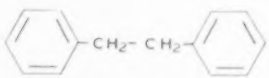
THE BALANCED PRESSURE SEAL

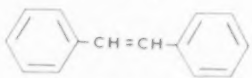


1,3-Diphenylcyclopentane

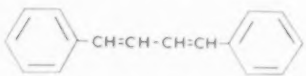
Exceptions



Bibenzyl



Stilbene

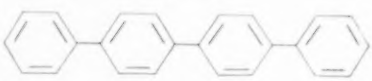


Bistyryl

When two or more benzene rings are directly united, they are given multiple radical names, whenever possible, a Latin prefix being used to denote the number of rings present. Otherwise they are named as derivatives of benzene or a smaller multiple phenyl group.

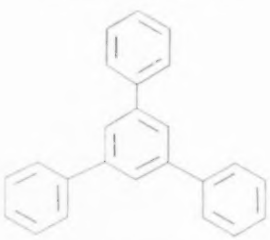
Examples:

Biphenyl



p-Quaterphenyl

2,2'-Diphenylbiphenyl



1,3,5-Triphenylbenzene

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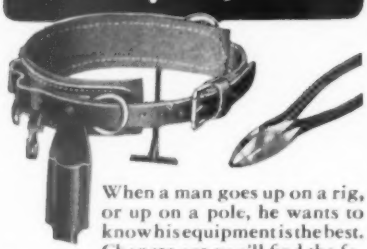
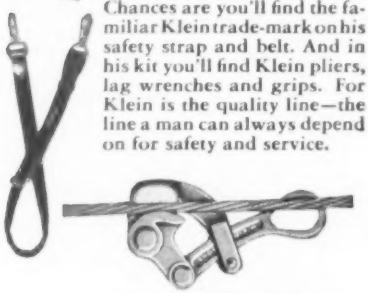


When a man goes up on a rig, or up on a pole, he wants to know his equipment is the best. Chances are you'll find the familiar Klein trade-mark on his safety strap and belt. And in his kit you'll find Klein pliers, lag wrenches and grips. For Klein is the quality line—the line a man can always depend on for safety and service.



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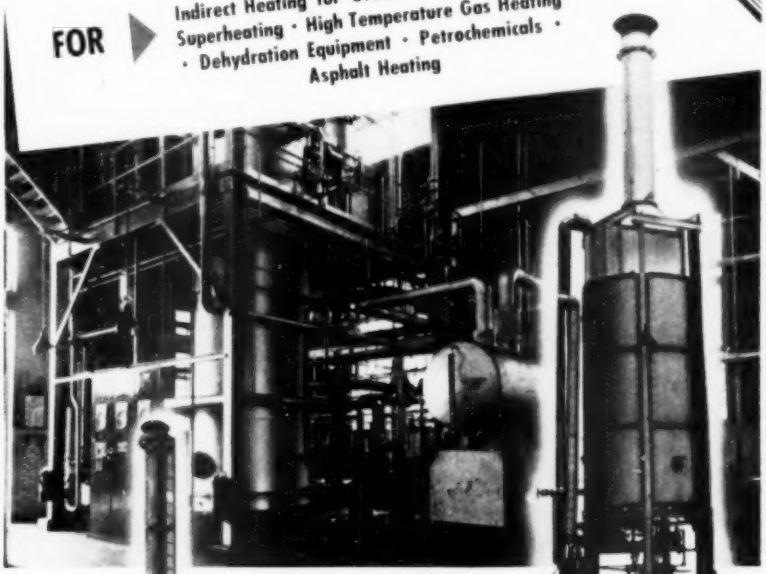
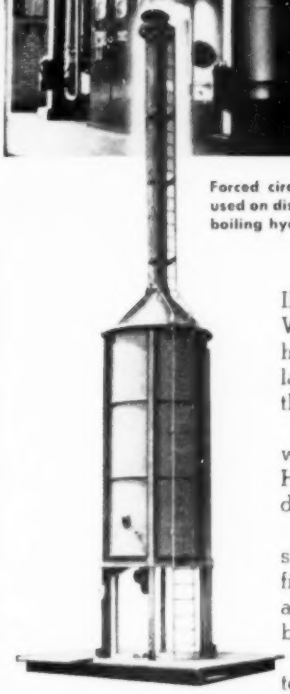


Forced circulation Dowtherm heating unit, used on distillation equipment in which high boiling hydrocarbons are handled.



Shop assembled oil heater used for indirect heating of grease kettles, at plant of a leading oil company.

Illustrated are a few of many uses of Struthers Wells direct fired heaters. Where indirect heating is used with these heaters, the circulating medium may be oil or Dowtherm, with the Dowtherm used in vapor or liquid phase.

Heating systems may be supplied complete with all instruments, controls and burners. High thermal efficiencies may be secured, if desired, using finned tube convection surface.

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Representatives in Principal Cities

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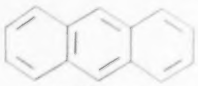
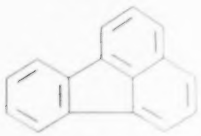
Examples of parent structures:



Anthracene

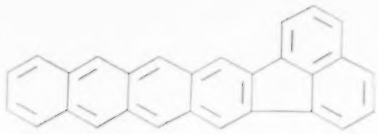


Fluoranthene

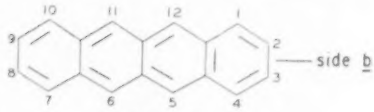
Chrysene

The naming of compounds by the fusion principle depends primarily on numbering as prescribed by Patterson and Capell in the Ring Index. The side of fusion is denoted by a letter which is related to the numbering of the parent. Numbers refer to the positions of fusion of the attached component.

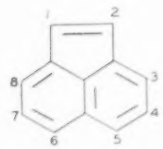
A graphic illustration follows:



Acenaphtho[1,2-*b*]naphthacene



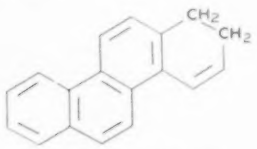
Naphthacene



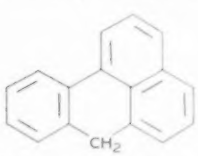
Acenaphthylene

Hydrogenated derivatives are denoted by the prefixes **dihydro, tetrahydro,** etc. When two hydrogens are attached to a single carbon atom at the state of lowest hydrogenation, the extra hydrogen is denoted by a number denoting the position followed by italic capital *H*.

Examples:



1,2-Dihydrochrysene



7*H*-Benz[*de*]anthracene

Univalent radical names are formed by changing the ending **ene** of the hydrocarbon to **enyl.**

Examples:

Regularly formed: chrysenyl, pyrenyl, indenyl, etc.

Recommended exceptions: naphthyl, anthryl, phenanthryl.

Bivalent radicals are named by changing the radical ending **yl** to **ylene.**

Examples: naphthylene, anthrylene, chrysenylene, indenylene, etc.

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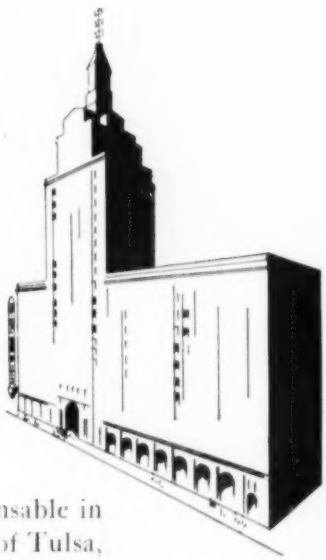

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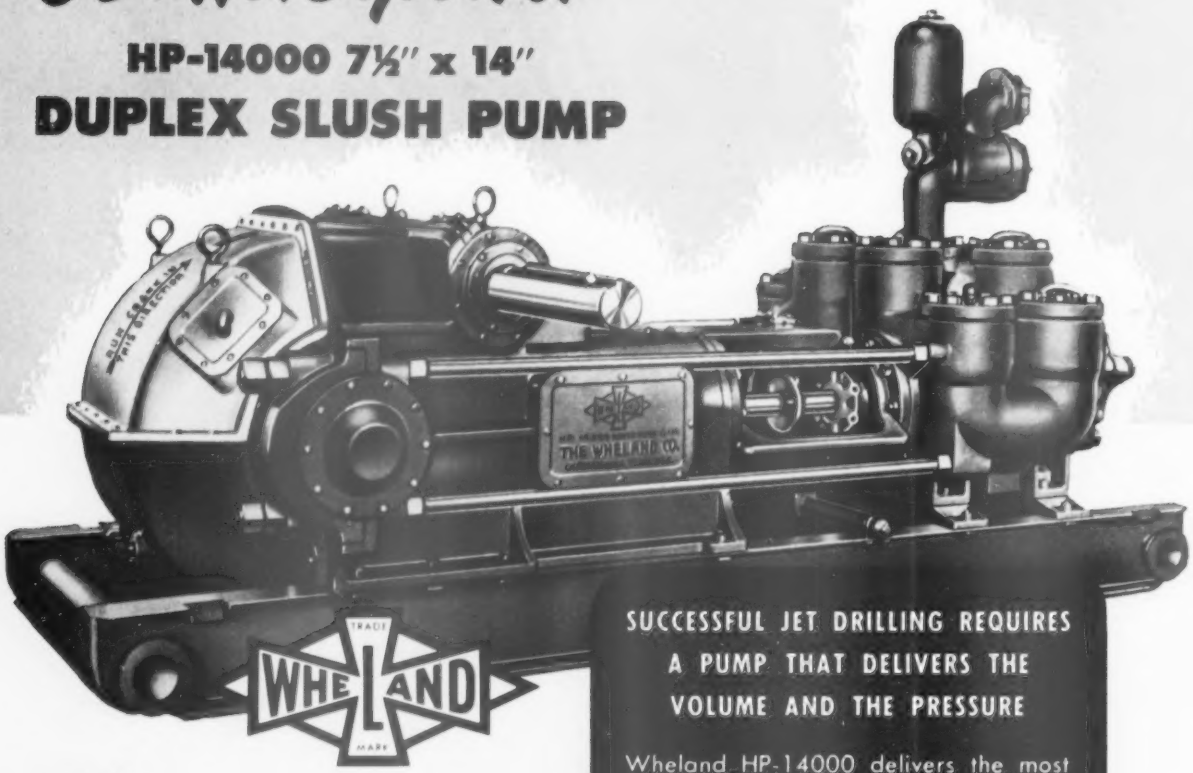

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MEASUREMENT TECHNIQUES IN MECHANICAL ENGINEERING. By R. J. Sweeney. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York. 309 pp. $5.50.

This volume provides a ready source of information on the common measurement techniques used in the performance testing of power equipment—engines, pumps, compressors, and combustion and heat-transfer apparatus. In presenting methods for high-accuracy measurements referred to calibration from fundamental standards, the author covers the most effective techniques and analyzes their on-the-job practicality. Seldom-found techniques for estimation of error in temperature measurements are presented in compact and concise terms. The discussion of instruments covers their primary function of measurement and indication, and their function as signaling devices to automatic controllers.

SYMPOSIUM ON TESTING METAL POWDERS AND METAL POWDER PRODUCTS. Published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 96 pp. $2.

This symposium was presented at the Cleveland meeting in 1952, and contains seven technical papers.

TEXTBOOK OF THE MATERIALS OF ENGINEERING. By Herbert F. Moore and Mark B. Moore. Published by McGraw-Hill Book Co., 330 West Forty-second Street, New York. 375 pp. $6.

This new publication is a revision and modernization of a leading text in the field. Concise presentation is made of the properties of various materials, used for machine and structural parts, which affect the strength, stiffness, ductility, and resistance to corrosion or wear. It offers recent information given by the electron microscope, a slight discussion of resistance to "fatigue" by metals under compressive loads, discussion of resistance to "fatigue" by metals under compressive loads, discussions of boron and titanium, prestressed and air-entrained concrete, and new treatment on numerous plastics with a tabulation of their physical properties.

SYMPOSIUM ON CONDITIONING AND WEATHERING. Published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 98 pp. $2.25.

Many of our highly useful engineering materials are affected by atmospheric influences, mostly adversely. A wide variety of materials such as paper, adhesives, textiles, plastics, cement, electrical insulating materials, all require temperature and humidity conditioning prior to if not during testing. Because of this need, this symposium was sponsored by A.S.T.M. Committee E-1 on Methods of Testing. Its principal purpose is to provide valuable knowledge in this field. It is hoped that this program will promote an expanded understanding of the importance of conditioning and weathering in the assessment of our materials of engineering and will encourage further effort to utilize controlled atmospheric phenomena in laboratory procedures.

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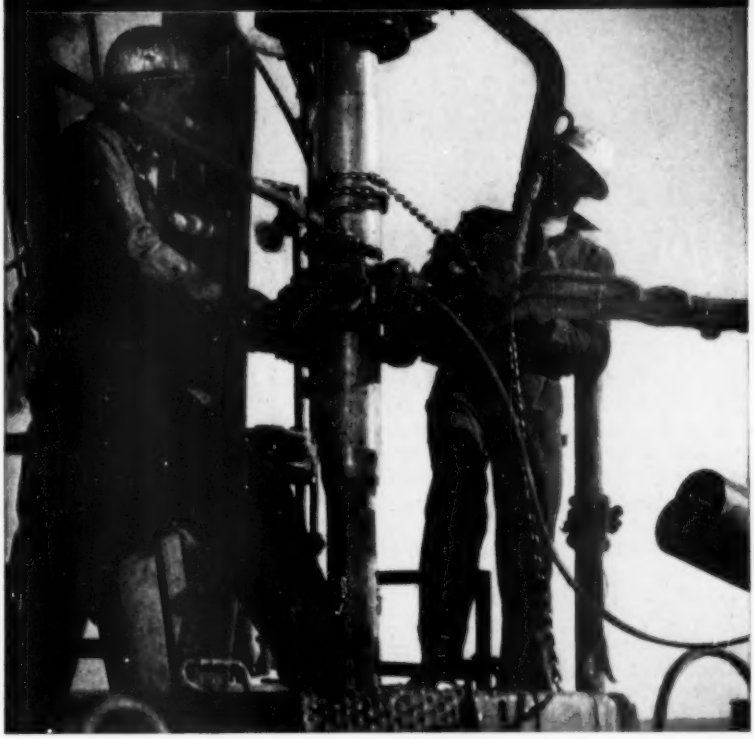

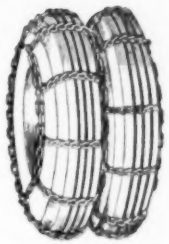

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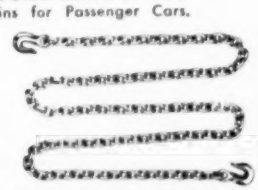

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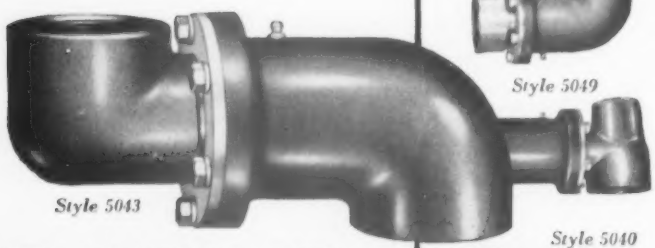

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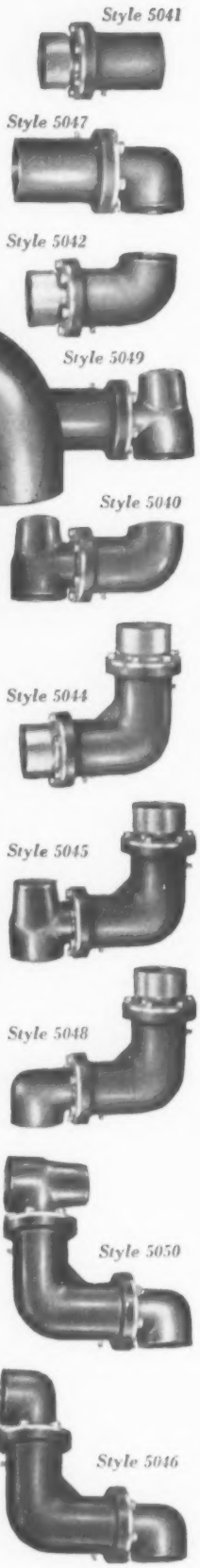

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THE ORIGINAL COMPOSITION CUP

PRESSURE DATA . . . are received at other end of system hookup by Cleveland Pressure Dispatcher John Muldoon. Robert Knowles is making changes on distribution system network diagram in background.

LEAK REPORT . . . in a trunk pipe line is being received by Division Foreman Earl Albertson from a line walker phoning from call box somewhere in the eastern Ohio hills.

PIPE-LAYING DETAILS . . . come over air waves from Cleveland Operating Division Superintendent Tom Noonan to Cleveland District Foreman Frank Benes, holding microphone. Dick Jones, A. S. Helbig Co. construction superintendent, stands next to Benes.

GAS-STORAGE DATA . . . Storage area pressure station data is radioed by field Department Foreman Glenn Griffiths. This is Willaman station in the Jackson-Stark storage area of the East Ohio Gas Co. system.

How radio aids East Ohio operations

NOW operating one of the best coordinated wire-radio networks in the United States, East Ohio Gas Co. operates on three frequency bands.

1. The 48.62-megacycles band is used in all long-distance communications between border stations, production and storage areas, transmission divisions, dispatching headquarters, and special repair work between cities.

2. The 158.19-megacycles band is for dispatching in Youngstown-Warren and Akron-Barberton distribution areas.

3. The 158.25-megacycles band is used for broadcast dispatching to mobile units of Cleveland operating departments and Canton-Massillon distribution areas.

System growth . . . Evron McNeel, head of East Ohio's communications, began with a lone transmitter in 1948, riding around talking to himself, exploring problems of radio-telephone. Today there are nearly 200 mobile units and 17 base stations. Two-way radios are scattered in an orderly way through the towns and countryside of northeastern Ohio. Radio systems are divided into three districts, using four licensed technicians to install and service the equipment. Well-placed base stations serve the mobile units, relaying mes-

sages and orders, carrying most long-distance communications.

"Long haul" . . . Long-distance radio contact has as its hub the Gross Farm base station with a powerful transmitter that keeps contact with the southernmost station at Price Farm, with Cleveland on the north, beyond Youngstown on the east and with western towns in East Ohio's system which are well within the Gross Farm broadcast perimeter.

Mobile units all over northeastern Ohio move under the Gross Farm radio blanket. Information from Cleveland is rebroadcast to Price Farm from which it is relayed to the most isolated radios along the Ohio River. Transmission Superintendent Wayne Carson and Production Superintendent Lou Evans are always in contact with all points via radio.

Dispatching . . . Gross Farm station operates on a 24-hour basis, broadcasting time and call letters every 15 minutes. Twelve minutes before each hour, operators hook up the entire telephone system from the Ohio River to Cleveland. Pressures, temperatures, and other operating information are phoned into Cleveland.

Some 60 miles away is Price Farm station. The routine at Price is much the same as at Gross Farm. Pressures and other information are phoned in, radio contacts kept clear to cars and trucks among the mobile units. Radio checks with the centrally located Gross Farm are made every 15 minutes through the day from 6 a. m. until midnight.

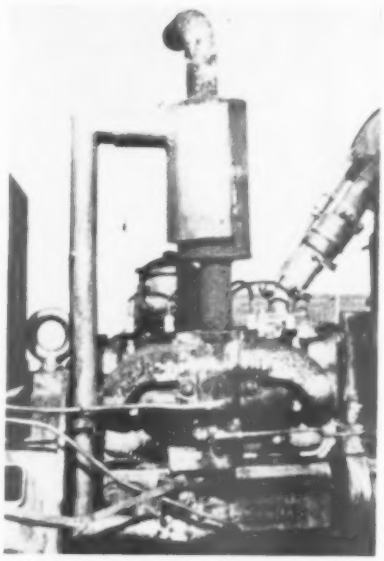
Scaffold Device Aids Boiler Cleaning

FIRST special capital award of $1,000 was made to John R. Barber, boiler cleaner at the Bayonne, N. J., refinery of Tide Water Associated Oil Co. for his suggestion in the company's national suggestion plan. The award was in addition to awards of $100 and $500 for his suggestion.

Barber proposed a method for erecting scaffolding in two of the 100,000-lb. per hour steam boilers, making it possible to effectively clean the superheater sections of these boilers. The tube spacing in the superheater sections was too narrow to permit erection of standard scaffolding. Due to lack of scaffolding the fly ash was not thoroughly cleaned from the tubes.

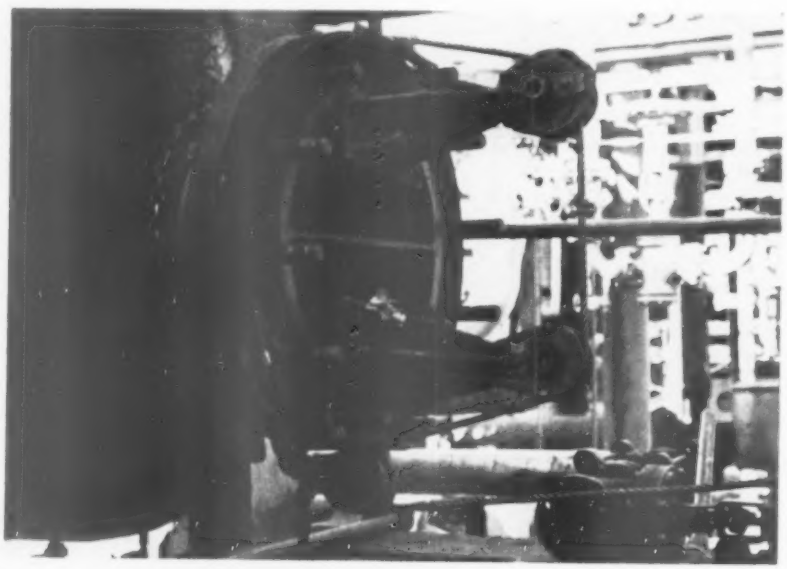
The suggestion was to use the boiler tubes themselves as the vertical supports for the scaffolding. Standard scaffold clamps were attached to the superheater tubes and a single plank laid across short horizontal tubing held by the clamps. The suggestion makes it possible to work anywhere in the superheater section and the tubes can be cleaned properly.

With proper cleaning the boilers' capacity has been increased because more air can be drawn through the superheater section. It was previously necessary to shut down these boilers before their normal inspection time to clean the superheater sections with the less effective method. Boiler efficiency has also been improved because a clean heat-transfer surface is exposed.



Preheating Engine Combustion Aid

A SIMPLE air heater may be arranged as illustrated. Where the exhaust muffler is placed just above the manifold, a piece of light-gage metal is bent around and tack welded on all sides except the bottom, which is the air inlet. Slip joints on 2½-in. tubing are employed to bring the hot air to the carburetor inlet. The entire assembly is then welded together so that all air which enters the carburetor passes over the hot exhaust muffler.



Forcing Tube Bundles Into Place

THE device shown here is used to force steam bundles into columns or kettles. One end of a cable is attached to the kettle behind the bundle flange, run over the pulley device, through a snatch block and out to a winch truck. As the cable is drawn up the bundle is forced into place. By using two of the devices an even force is applied to the bundle.

This method was suggested by L. R. Rannals at the Plains Plant, butadiene section, Phillips Chemical Co., at Borger, Tex.

by
Robert L. Jacks*

PUMP SELECTION—8

How to Make a Design Calculation

THE following relationships can be used to estimate the effect of changing impeller size (check with manufacturer):

1. The head-capacity curve of a pump with a given diameter impeller can be converted to that for a new impeller size by moving several points on the curve horizontally (capacity scale) an amount proportional to the ratio of impeller diameters and vertically (head scale) an amount proportional to the square of this ratio and constructing a new curve through these points.

2. The brake-horsepower curve is altered by moving it horizontally an amount proportional to the ratio of impeller diameters and vertically an amount proportional to the cube of this ratio.

3. The efficiency curve will move horizontally only and will shift an amount which aligns it with the new capacity points.

Another method . . . The pump characteristics may also be altered by changing the rotational speed. To approximate the effects of changes in speed use these relatives:

A. Capacity	$(Q_1/Q_2) = (n_1/n_2)$
B. Head	$(H_1/H_2) = (n_1/n_2)^2$
C. Brake horsepower	$(BHP_1/BHP_2) = (n_1/n_2)^3$
D. Efficiency	unaffected by impeller speed (the efficiency curve, however, will shift an amount necessary to align it with the new capacity curve)

The following example outlines design calculation for a new pump. Calculation for an existing pump will be given later.

Example 1—New pump . . . A gas-oil feed (28.5° A.P.I.) is to be pumped from tankage into a cracking furnace in accordance with the diagram in Fig. 1. A pump is to be designed for process service and continuous operation handling 8,725 bbl. per day (at 60° F.) of the feed stock from storage at atmospheric pressure. The following design results are available from other equipment calculations:

Optimum suction line diameter = 8 in.

Optimum discharge line diameter = 4 in.

Pressure drop in suction line for normal flow = 0.14 psi.

Pressure drop in discharge line (piping only) for normal flow = 34 psi.

Pressure drop in exchanger for normal flow = 12 psi.

Pressure value at control point on exchanger discharge = 125 psig.

Pressure control on pump suction equipment = atm. vent on tank.

Temperature maintained in storage tank = 150° F.

*Esso Standard Oil Co., Louisiana Division, Baton Rouge. Excerpt from paper in Chemical Engineering Progress, May 1953, page 235.

Design Calculations

The sketch of the installation is shown in Fig. 1 and the resultant pump specification is given in Fig. 1 of Installment No. 4 of this series (July 20). Most of the values and specifications reported on the specification sheet in Fig. 1 of Installment No. 4 are self-explanatory. However, some require explanation as follows:

1. Corrosiveness. This pump is to be in service in a petroleum refinery where the crude fractions contain sulfur. The sulfur content of the gas oil stream to the cracking unit was determined to be in the range of 0.5 wt. per cent, a concentration expected to impart slight corrosiveness to the fluid and calling for light alloy steel.

2. Gallons per hour at 60° F. and 760 mm. The maximum flow is assumed to be 20 per cent greater than normal. Hence:

Max. gal. per hour = 120 (8,725) (42/24)
= 18,350 g.p.h.

The minimum flow is taken as 75 per cent of the normal, or

Min. gal. per hour = (0.75/1.20) (18,350)
= 11,500 g.p.h.

3. Suction pressure. The minimum suction pressure on the pump will result from a low level in the tank. Neglecting the difference in elevation between the outlet nozzle of the tank and the suction of the pump (a usual assumption unless the N.P.S.H. is near the minimum), the pump suction pressure at minimum tank level is

(0 psig. tank pressure)
— (0.20 psi. ΔP in suction line)
where 0.20 = (120 per cent)² of 0.14 psi. at normal flow

This value is so close to atmospheric pressure, the latter is reported.

4. N.P.S.H. Net positive suction head is the difference in suction pressure and the vapor pressure, or 14.7 psi. Using the specific gravity at 150° F. and 0.840, this is converted to feet as follows:

N.P.S.H. = 14.7 (2.31/0.840)
= 40.4 ft. of fluid flowing

5. Discharge pressure. This value is found as follows:

Pressure value at point of constant control	125 psig.
ΔP due to potential head = (20 — 3) [(0.780 × 62.4)/144]	6 psi.
ΔP in lines at max. flow = (34 psi.) (1.20)²	49 psi.
ΔP in exchanger at max. flow = (12 psi.) (1.20)²	17 psi.
ΔP in orifice of FR	3 psi.
ΔP in control valve, PRCV	ΔP
	(200 + ΔP)

For the control valve, the following rough calculation is made:

Line size = 4 in.

G.p.m.$_{max}$ = (18,350/60) = 306; system ΔP$_{max}$ = 60 psi.

G.p.m.$_{norm}$ = 306/1.20 = 255; system ΔP$_{max}$ = 49 psi.

G.p.m.$_{min}$ = 0.75 (255) = 191; system ΔP$_{max}$ = 29 psi.

Sp. gr. at 300° F. = 0.78 (approx.).

Taking a pump discharge pressure of 220 psig., the valve pressure drops will be (220 — 131) = 89 psi. minus the line pressure drops, or 20.0, 40.0, and 60.0 psi. for maximum, normal, and minimum flows respectively. A 3-in. control valve will pass 400 g.p.m. wide open at 20.0 psi. ΔP. Therefore, (306/400) × 100 = **76.5** per cent of the maximum port area of a 3-in. valve is required for passing the maximum flow.

A wide-open 3-in. valve will pass 570 g.p.m. at a ΔP of 40.0 psi. Therefore, it will pass 255 g.p.m. at the same ΔP with (255/570) × 100 = 45.0 per cent of its port area open.

A wide-open 3-in. valve will pass 700 g.p.m. at a ΔP of 60.0 psi. Therefore, it will pass 191 g.p.m. at (191/700) × 100 = 27.3 per cent open.

This design is satisfactory from a control standpoint since the valve is less than 80 per cent open at maximum flow, between 40 and 60 per cent open at normal flow and greater than 20 per cent open at minimum flow.

The discharge pressure required is thus **220 psig.**

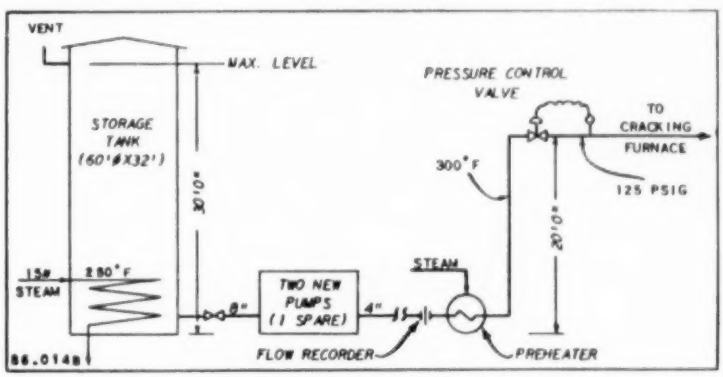


Fig. 1—Simplified flow plan for pump design of Example 1.

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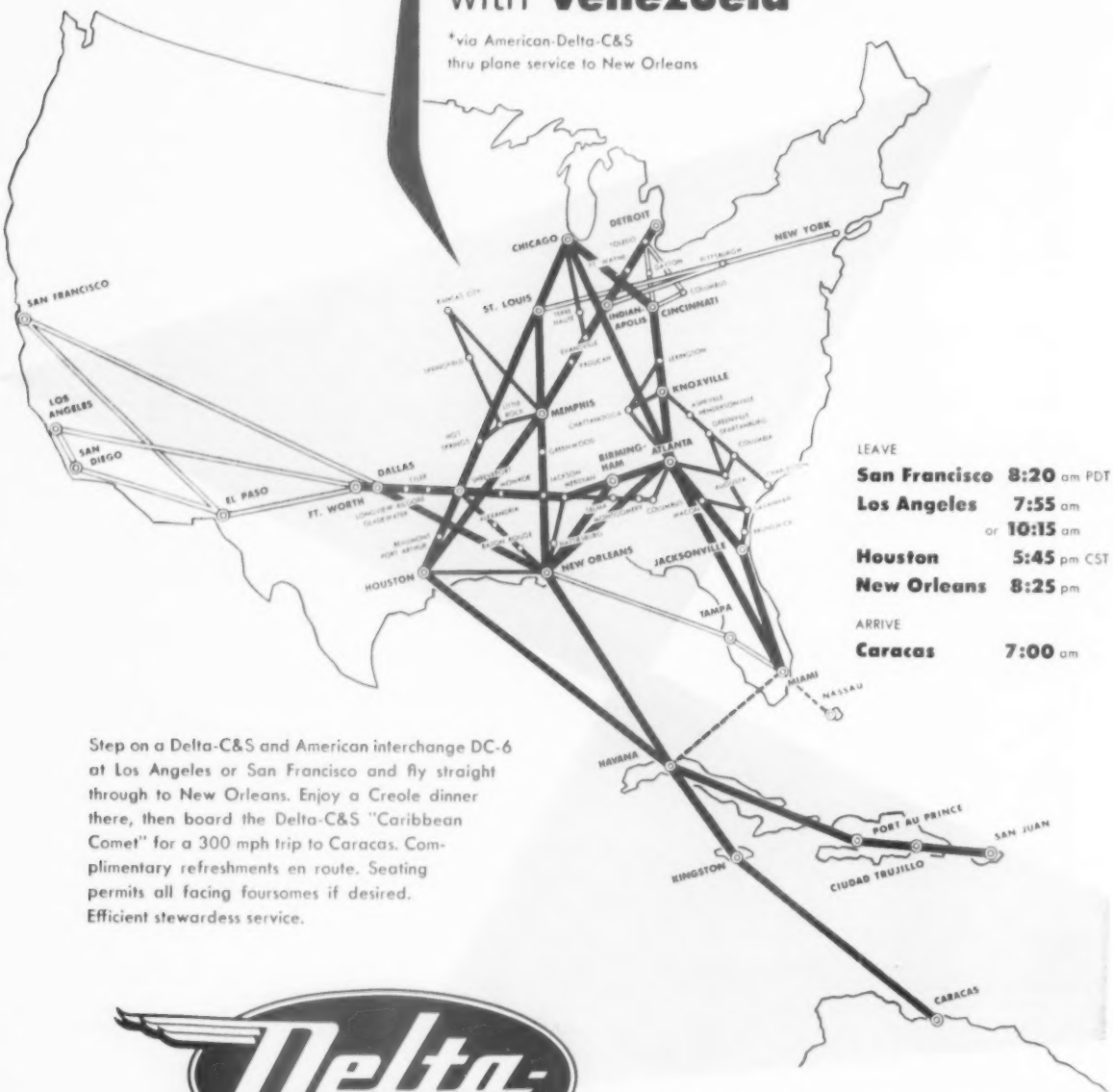
*via American-Delta-C&S thru plane service to New Orleans



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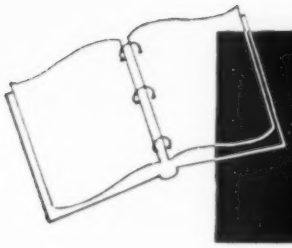

REFINER'S NOTEBOOK

Cost Comparison—Shop-Built Vessel

by I. E. Boberg* and W. R. Fickett*

IN this concluding installment on graphitization-resistant construction, the shop-built vessel (Fig. 2) is considered. A small amount of internals is included. A pressure of 100 psi. is considered reasonably representative of a probable range from 40 psi. to 180 psi. Table 1 summarizes information for the shop-built vessel. A.P.I.-A.S.M.E. code is adhered to in all respects.

Welding problems . . . Unfortunately there is no extensive experience background in welding of 1 per cent chromium-½ per cent molybdenum steel. There has been experience with such materials as pipe. At this writing, extensive tests of various electrodes are planned, but these tests have not been completed.

There has been some experience with A.S.T.M. A-301, grade "A," which is ½ per cent chromium and ½ per cent molybdenum. So far as we know, at least four field-erected vessels of this material have been constructed by ourselves and others. Based on piping experience, i.e., to the effect that no serious graphitization has ever been experienced in weld metal, all of these vessels were welded with carbon-molybdenum electrode, probably an A.S.T.M. A-316-48-T, classification E 7010.

Reports from Battelle Memorial Institute indicate that graphitization has been found in weld metal, and that the chromium content of the weld metal and fusion zone may be important. If this can be established as fact, the successful field welding of A.S.T.M. A-301, grade "A," with carbon-molybdenum electrode may have very little significance in any assessment of future work.

With regard to the one vessel which has thus far been constructed of A.S.T.M. A-301, grade "B," the reports which reach us indicate that a very considerable amount of trouble from weld porosity and cracking was encountered in the shop where a large part of the welding was done. The cracking occurred principally in the vicinity of fittings. Strangely enough, the closing welds in the field gave very little trouble.

Porosity might be attributable to the use of an A.S.T.M. 9016 (low-hydrogen) electrode. It is our intention at least to experiment with what might be termed an 8010 electrode, in which about 1 per cent chromium is included in the coating. The test will consist in whether the chromium content of the weld metal and fusion zone can be maintained at satisfactory levels by this method. If it cannot, it may be necessary to use low-hydrogen electrodes, and to attempt elimination of porosity by means of procedure and by careful attention to keeping the electrode dry.

In the meantime we believe that carefully controlled preheating can do a great deal toward the elimination of the cracking which has been experienced in the air-hardening of materials such as A.S.T.M. A-301-B, especially around highly restrained fittings. Preheating over a sufficient area should slow down the cooling rate and permit entrapped hydrogen to escape. With preheat it may well prove unnecessary to risk porosity troubles through the use of low-hydrogen electrodes. It is our present opinion that a preheat temperature of 300° F. should be adequate.

The carbon content of the steel is important to determining the procedures which are necessary. One producer stated that it was necessary to keep carbon below 0.17 per cent if cracking was to be avoided during rolling. It would seem prudent to order A.S.T.M. A-301-B with a maximum carbon content of 0.15 per cent, or even less, if this is obtainable. In our own work, we would always order this material to be normalized at the mill.

*Chicago Bridge & Iron Co., Chicago, Ill. Paper presented at A.P.I. refining division meeting, New York, 1953.

TABLE 1—SHOP-BUILT VESSEL

Steel temperature, F.:	650	900		950		1,000	
Material (A.S.T.M.):	A 285 C	A 285 C	A 301 B	A 201 B	A 301 B	A 201 B	A 301 B
Unit stress, psi.	13,750	6,500	13,100	4,500	11,000	2,500	7,500
X-ray	No	No	No	Yes	No	Yes	No
Stress-relieve	No	No	Yes	Yes	Yes	Yes	Yes
Joint "E," per cent	80	80	85	95	85	95	85
Thickness, in.:							
A	0.50	0.94	0.44	1.38	0.56	2.49	0.81
B	0.60	1.17	0.55	1.43	0.65	2.59	0.95
Cost, dollars:							
Vessel	0.54	0.63	0.66	0.85	0.70	1.47	0.83
Insulation	*0.46	*0.23	*0.23	*0.23	*0.23	*0.23	*0.23
Total	1.00	0.86	0.89	1.08	0.93	1.70	1.06

*4-in. insulation outside only. Cost basis, $4.00 per square foot. †4-in. insulation inside only. Cost basis, $8.00 per square foot. Vessel size increased to yield same inside capacity. For extremes of insulation, i.e., cost range from $3.50 to $9.50 per square foot, the 650-F vessel costs would be as follows:

	$3.50 per sq. ft.	$9.50 per sq. ft.
Vessel	0.54	0.54
Insulation	0.20	0.55
Total	0.74	1.09

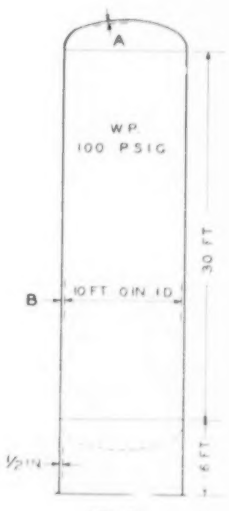

Fig. 2

LLOYD M. URBAN, *Party Chief, came to work at Independent from Rice Institute. He began his practical field training as helper on a survey party, and has progressed with the Company for 15 years through the jobs that provide the experience background necessary for a party chief.*

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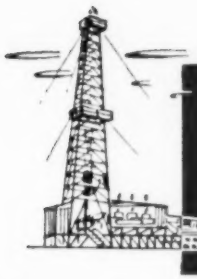

Use and Care of Wire Rope—14*

Cutting off ends . . . It is good practice to cut off short lengths of rope as wear develops. This may require an original length slightly longer than normally used. When severe abrasion or numerous fatigue breaks occur near one end as in the case of drag scraper ropes or drag ropes on draglines or closing lines in clamshell buckets, the cutting of this worn section prolongs its useful life. Wire breaks from vibration fatigue occur at socket connections and short lengths cut off there and the reattachment of the socket may prevent a break in rope and possible loss of several feet of good rope.

This same condition of vibration fatigue occurs near the socket or under clips on shaft ropes, particularly in shallow shafts, where the vibration from high-speed hoisting is very severe. It is most important that frequent inspections be made. Sections of rope should be cut off where a few broken wires are found. In the case of a socket 5 or 6 ft. at least should be removed, and in the case of clips or clamps the entire length covered by them on the live side should be cut off.

Excessive wear and displaced or broken wires often occur on drums winding more than one layer. This will be noticed where the wraps of one layer cross those on an under layer and at the flanges where the rope turns back to start the next layer. To distribute this wear and insure longer rope life, a length should be removed at the drum attachment equal to 1¼ times the circumference of the drums. This should be done before great damage develops and repeated at intervals.

Broken wires are apt to be found in multiple reeved ropes where the midpoint is in contact with a small equalizing sheave as is the case on many cranes. Rope life will be increased if this point is shifted, by cutting off a short length at the end on one of the drums.

*Taken from Bulletin 61, Use and Care of Wire Rope, A. Leschen & Sons Rope Co.

Reversing ends . . . Frequently the most severe deterioration occurs at a point too far from the end to allow the worn section to be cut off. In such cases the rope may be turned end for end to bring a less-worn section into the area where conditions are most destructive. Incline rope and draglines are those most benefited by changing ends. This changing must be carefully done to avoid damaging the rope.

Swivel sockets . . . When a heavy load is supported on a wire rope, the rope tends to rotate. A swivel socket that is free to turn will allow some of the normal twist in the rope to run out. The rope may then lose its lay and become unbalanced. If the accumulation of twist becomes excessive, a swivel socket with a locking device may be used. This condition can then be relieved at intervals by unlocking the swivel and allowing some twist to run out. However, this should be carefully controlled and the swivel relocked before resuming operation of the rope.

Stretch of wire rope . . . There are two kinds of stretch to be considered within the elastic limit of a wire rope—constructional and elastic stretch. The constructional stretch is permanent and starts to develop as soon as stress is applied. It is caused by the adjustment of the wires and the seating of the strands upon the core, and in the field most of it occurs within the first few days, or weeks, depending upon the amount of load. In the ordinary ropes this will be approximately 0.50 to 0.75 per cent of the length of rope under load.

A large part of the constructional stretch may be removed by prestressing. The prestressing load should be equal to or greater than the estimated working load, but must be below the elastic limit.

Elastic stretch is the temporary elongation of the metal when under load. The rope will return to its normal length when the load is removed, provided this load has been kept below the elastic limit of the metal. This limit for the usual rope is at about 55 to 60 per cent of its ultimate breaking strength. A rough estimate of the elastic stretch of a wire rope under a load of one-fifth of its ultimate strength is from 0.25 to 0.50 per cent, depending on its exact construction. This stretch is directly proportional to the load and length of rope involved and inversely proportional to its modulus of elasticity and metallic area.

Elastic stretch in feet

$$= \frac{\text{Load in pounds} \times \text{length in feet}}{\text{Metallic area in sq. in.} \times \text{modulus (E)}}$$

On account of the variation in rope structure and the form of the wires and strands, only approximate figures can be used for the elastic modulus. A number of these are shown in the following table:

APPROXIMATE MODULI OF ELASTICITY

Wire Ropes with Fiber Core	
6 by 7 classification	13,000,000 to 14,000,000 lb.
6 by 19 classification	12,000,000 to 13,000,000 lb.
Style B and Style G flattened strand	12,000,000 lb.
6 by 37 classification	11,000,000 lb.
8 by 19 classification	9,000,000 to 10,000,000 lb.
Wire Ropes with Wire Rope Core	
6 by 7 classification	15,000,000 to 16,000,000 lb.
6 by 19 classification	14,000,000 to 15,000,000 lb.
Style B and Style G flattened strand	15,000,000 lb.
6 by 37 classification	14,000,000 lb.
Galvanized Strand	
7-wire strand	21,000,000 lb.
19-wire strand	19,000,000 lb.
37-wire strand	18,000,000 lb.

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SIZING CONTROL VALVES—6

Angle Bodies

by G. F. Brockett* and C. F. King*

AS previously stated, preliminary tests showed that flow through single-seated angle-style bodies in the direction of closing the inner valve did not follow the same laws as globe bodies. Fig. 1 illustrates results of a series of tests on a 2 by 3 in. "Sweep-Flo" type angle body with a 1½-in.-diameter throttle-plug inner valve. These tests were run with 100 psia. constant inlet pressure and with other conditions similar to those used in the 2-in. double-ported globe body tests illustrated in Fig. 1 of Installment No. 2 (July 6, 1953, page 115). Note that with a 200° F. inlet temperature, the apparent critical pressure drop for this angle body is 19 psi., as compared to a critical drop of 70 psi. for the same inlet temperature and pressure with a globe body as shown in Fig. 1 of Installment No. 2.

*Fisher Governor Co. Presented at Symposium on Instrumentation, A. & M. College of Texas, 1953.

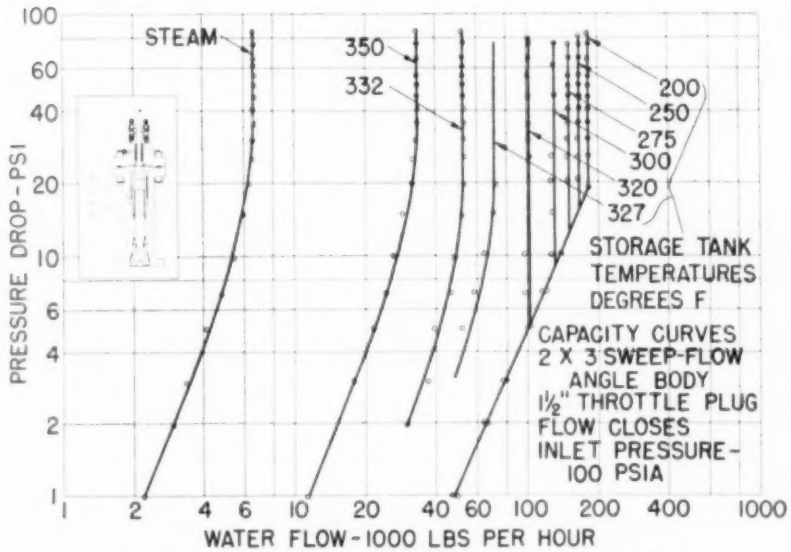


Fig. 1—Capacity curves for 2 by 3-in. Sweep-Flo type angle body.

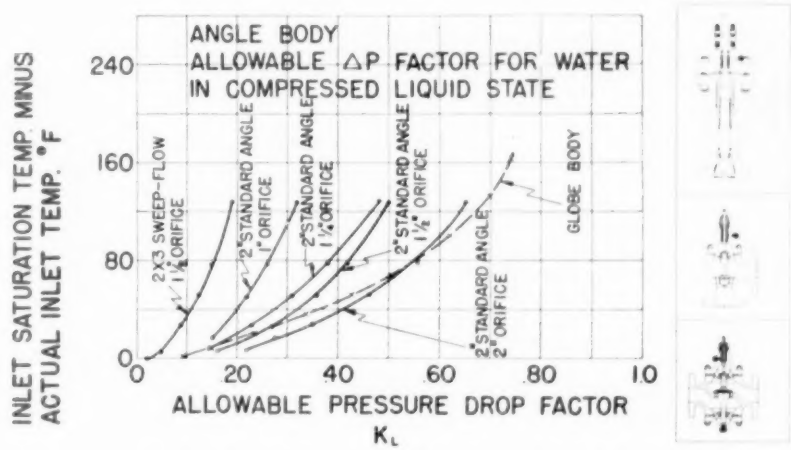
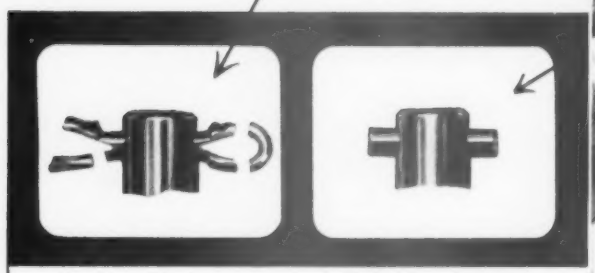


Fig. 2—Allowable pressure-drop factor curves for angle bodies.

In addition to the streamlined Sweep-Flo type of bodies, the more or less standard types of single-seated angle valves with various body and orifice sizes were also tested. The comparative results of some of these tests are shown graphically on Fig. 2. The "inlet saturation temperature minus actual inlet temperature" has been plotted against "allowable pressure drop factor," as previously defined. The body type and orifice diameter are marked on the curves. The dashed-line curve labeled "globe body" has been copied from Fig. 1 of Installment No. 4 (August 3) for comparative purposes. Note that the 2 by 3-in. Sweep-Flo curve is asymptotically approaching an allowable pressure drop factor of 0.20. This means that it should not be sized for pressure drops greater than 20 per cent of the inlet pressure. Data from different orifice sizes in 2-in. standard angle bodies follow quite widely separated curves.

Do cotter pin failures make "stop-and-go" operators of your roller chains?



Spring-Lock Fasteners outlast cotter pins more than ten to one!

Standard heat-treated cotter pin (left) shows this wear after only 3 hours on laboratory fatigue tester. Fifty hours of same grueling punishment leave Spring-Lock (right) in unimpaired state.

Do some of your roller chain applications suffer—run up downtime through cotter pin failures?

The answer to your problem has been tested—and *proved*—in the field for over a year.

The Morse Spring-Lock Fastener is *not* a pin; has none of a pin's limitations. The Spring-Lock is a spring steel cylinder that is *compressed* into a pinhole smaller than its own diameter; locks into place through its expansion. The seated Spring-Lock *cannot* slip or shear; must be removed with hammer and punch.

Assembly and disassembly of Spring-Lock-fastened Morse Roller Chains is easier and faster, because the fastener *can* be inserted and removed with only punch and hammer. Then, the Spring-Lock can be used time after time.

At no increase in price, Spring-Lock Fasteners are currently available in the large-pitch Morse Roller Chains: 1¼", 1½", 1¾" and 2" pitch, single or multiple widths, standard or heavy-duty series. If some of your roller chain applications have been marked by troublesome, costly cotter pin failures, check into Morse Roller Chains *with Spring-Lock Fasteners*. Standard cotter pins are also available, and will be furnished unless otherwise specified. For more information, see your local Morse distributor or factory representative listed here. MORSE CHAIN COMPANY, Dept. 498, 7601 Central Avenue, Detroit 10, Michigan.

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MORSE
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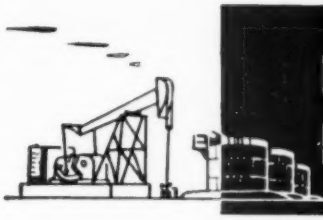
ELECTRIC LOGGING—9



ENGINEERING FUNDAMENTALS

Two-Electrode Device or Normal Sonde

by R. I. Martin*

IN view of the shortcomings of the monoelectrode, the Schlumberger brothers used a two-electrode device as the standard, or normal, method. Referring to Fig. 2 of Part 7, a second electrode M may be placed at a fixed distance from electrode A to measure the potential occurring on the equipotential sphere passing through M. The equation

$$V = \frac{RI}{4\pi r}$$

may be applied directly to this device and the distance AM substituted for r.

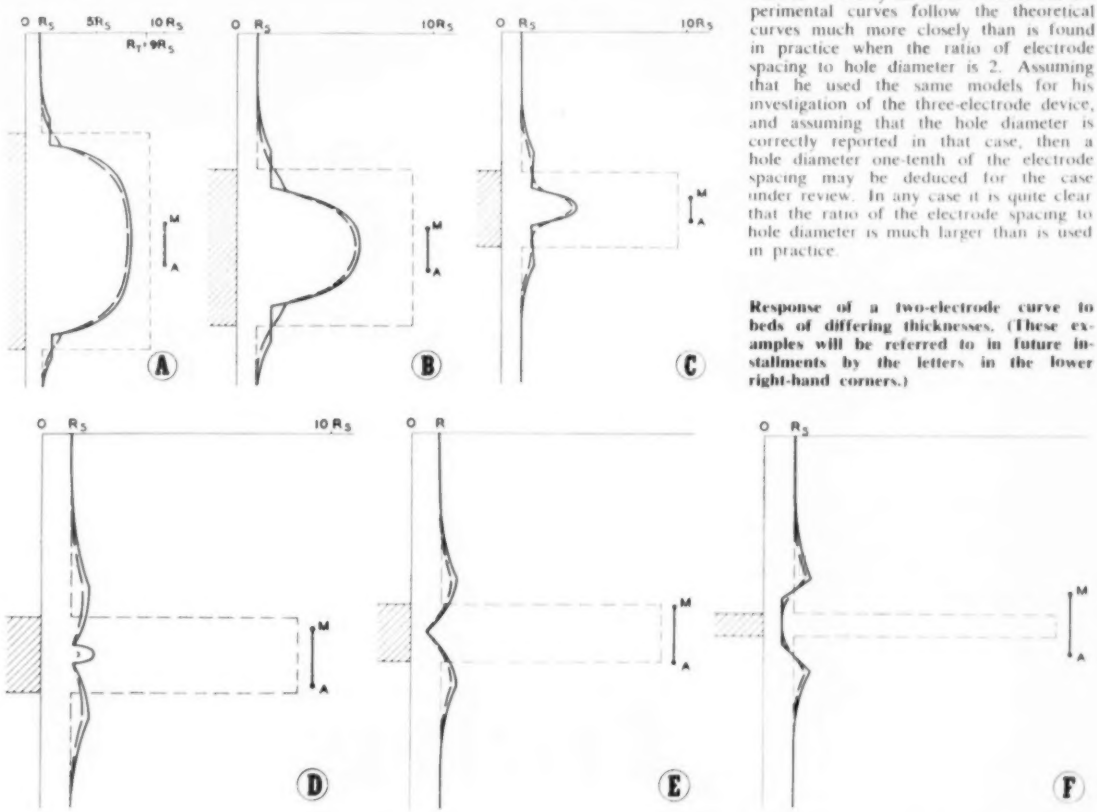
AM is known as the electrode spacing of the normal device and is usually 16 in. although it may be as small as 8 in. or as large as 32 in. From the theoretical point of view, the two-electrode device is equivalent to a large monoelectrode. With the use of a second electrode, however, the dimensions are not limited by the diameter of the bore hole.

As 50 per cent of the voltage drop occurs in the distance 2r, or 2AM, it is arbitrarily assumed that the depth of investigation, or penetration, of the two-electrode device is twice the electrode spacing.

In practice the medium logged is not homogeneous so that the current and potential distribution is not so simple as shown. It is further complicated by the presence of the bore hole filled with mud. Under these conditions it is also impossible to keep the flow of current constant. In spite of these complications, however, satisfactory logs are usually obtained.

In order to evaluate some of these factors qualitatively, the six accompanying examples show the response of a two-electrode curve to beds of differing thicknesses. In all cases the true resistivity of the sand R_T is 9 times the resistivity of the surrounding shale Rs. The true resistivity relationships are shown by the dotted line in all cases. The solid lines are calculated curves, neglecting the influence of the borehole because there was no known method of including it in the calculations.

Since the effects of the mud cannot be calculated, Guyod carried out experiments and obtained the results shown by the dashed lines. In these experiments the mud resistivity Rm was made equal to the resistivity of the surrounding shales Rs. It is also important to know the diameter of the bore hole used in the experiments. In the text Guyod states that it is 2½ times the electrode spacing. This is obviously an error because his experimental curves follow the theoretical curves much more closely than is found in practice when the ratio of electrode spacing to hole diameter is 2. Assuming that he used the same models for his investigation of the three-electrode device, and assuming that the hole diameter is correctly reported in that case, then a hole diameter one-tenth of the electrode spacing may be deduced for the case under review. In any case it is quite clear that the ratio of the electrode spacing to hole diameter is much larger than is used in practice.

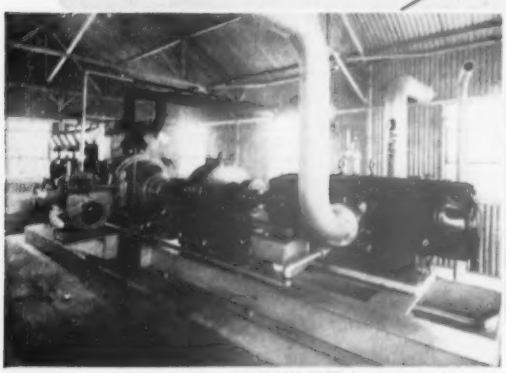


Response of a two-electrode curve to beds of differing thicknesses. (These examples will be referred to in future installments by the letters in the lower right-hand corners.)

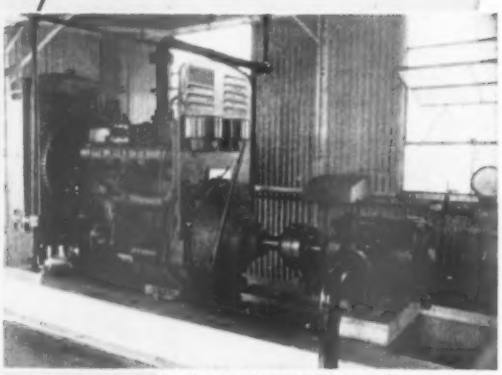
*Assistant professor of petroleum engineering, Missouri School of Mines and Metallurgy.

Five two-stage gas boosters, each handling 1,770,000 SCFD from 10—to 120—psig, at 800 rpm, direct connected to V-12 Climax gas engines.

FULLER ROTARY COMPRESSORS



Single-stage gas booster handling 3,560,000 SCFD from 15—to 45—psig, driven by V-12 Climax gas engine through gear speed reducer.



Single-stage gas booster handling 2,400,000 SCFD from 150—to 250—lb. psig, at 870 rpm, direct connected to Waukesha gas engine.

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Fuller Compressors require little maintenance because only the rotor, blades and bearings move. No valves to leak or seats to grind. Blades automatically compensate for wear . . . maintained capacity for the life of the machine. Pulsations and vibrations are reduced to a minimum. For the most efficient, economical way to boost pressures, install the F ller Rotary Compressor. Write for Bulletin C-6, now.

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Part 41 of a series

by Dr. B. E. Lauer, Head, Department of Chemical Engineering, University of Colorado

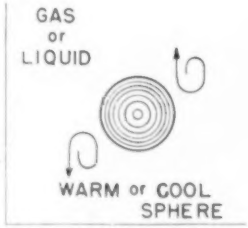
h_f HEAT TRANSFER

COEFFICIENT of HEAT TRANSFER through FILM between a SPHERE and a FLUID

Fluid Movement: Natural Convection

Heat Movement: Heating or Cooling

Size of Spheres: Small
Liquid R < 0.15 ft.
Gas R < 0.5 ft.



EQUATION:

$$h_f = 0.63 \frac{K}{R}\left[\frac{R^3 \beta \rho^2 g C \Delta t}{\mu k}\right]^{\frac{1}{4}}$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr. sq. ft. °F.

k - Thermal conductivity of fluid, BTU/hr. ft.^{2} °F./ft.

R - Radius of spheres, ft.

g - Acceleration of gravity. 4.17×10^8 ft./hr.^{2}

β - Coefficient of volumetric expansion of fluid. For ideal gas is equal to $1/T_R$.

ρ - Density of the fluid, lbs./cu. ft.

Δt - Temperature difference between wall and gas, °F.

C - Specific heat of fluid at constant pressure, BTU/lb. °F.

μ - Viscosity of fluid, lb./ft. hr.

LIMITATIONS:

Equation applicable for values of the function $\left[\frac{R^3 \beta \rho^2 g C \Delta t}{\mu k}\right]$ is between 10^3 to 10^9

PHYSICAL CONSTANTS: The values of the physical constants such as density, viscosity and others are reported in the International Critical Tables, in several handbooks, and in the technical literature.

Page references in the Chemical Engineers' Handbook, J. H. Perry (1948) are as follows:

for ρ -- 130-148, 175-195, 1582.
μ -- 370-374, 1196, 1696.
δ -- 200-202, 1975.
k -- 459-461, 1205, 1697.
C -- 225-236, 297, 1586, 1696.

REFERENCES:

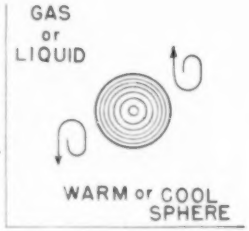
1. Klug, W. J., Tech. Thesis, May, 1950, p. 880.
2. Introduction to Heat Transfer, Brown and Marco, p. 114.

COEFFICIENT of HEAT TRANSFER through FILM between a SPHERE and a FLUID

Fluid Movement: Natural Convection

Heat Movement: Heating or Cooling

Size of Spheres: Large
Liquid R > 0.15 ft.
Gas R > 0.5 ft.



EQUATION:

$$h_f = 0.15 \frac{k}{R}\left[\frac{R^3 g \beta c \rho^2 \Delta t}{\mu k}\right]^{\frac{1}{3}}$$

or

$$h_f = 0.15 \left[\frac{k^2 g \beta c \rho^2 \Delta t}{\mu}\right]^{\frac{1}{3}}$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr. sq. ft. °F.

k - Thermal conductivity of fluid, BTU/hr. ft.^{2} °F./ft.

R - Radius of spheres, ft.

g - Acceleration of gravity. 4.17×10^8 ft./hr.^{2}

β - Coefficient of volumetric expansion of fluid. For ideal gas is equal to $1/T_R$.

ρ - Density of the fluid, lbs./cu. ft.

Δt - Temperature difference between wall and fluid, °F.

C - Specific heat of fluid at constant pressure, BTU/lb. °F.

μ - Viscosity of fluid, lb./ft. hr.

LIMITATIONS:

Equation applicable for values of the function $\left[\frac{R^3 g \beta c \rho^2 \Delta t}{\mu k}\right]$ is over 10^9.

PHYSICAL CONSTANTS: The values of the physical constants such as density, viscosity and others are reported in the International Critical Tables, in several handbooks, and in the technical literature.

Page references in the Chemical Engineers' Handbook, J. H. Perry (1948) are as follows:

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C -- 225-236, 297, 1586, 1696.

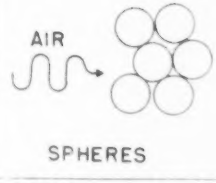
REFERENCES:

1. Klug, W. J., Tech. Thesis, May, 1950, p. 880.
2. Introduction to Heat Transfer, Brown and Marco, p. 114.

COEFFICIENT of HEAT TRANSFER through FILM between SPHERES and AIR

Air Movement: Turbulent

Heat Movement: Heating or Cooling



EQUATION:

$$h_f = 0.33 \frac{k_f}{D}\left[\frac{DV\rho}{\mu_f}\right]^{0.6}$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr. sq. ft. °F.

k_f - Thermal conductivity of air at t_f, BTU/hr. ft.^{2} °F./ft.

D - Outside diameter of spheres, ft.

V - Velocity through minimum free area, ft./hr.

ρ - Density of air, lb./cu. ft.

μ_f - Viscosity of air at t_f, lb./ft. hr.

t_f - Film temperature, assumed as arithmetic average of sphere temperature and bulk air temperature, °F.

LIMITATIONS:

Reynolds number 40 - 100,000

PHYSICAL CONSTANTS: The values of the physical constants such as density, viscosity and others are reported in the International Critical Tables, in several handbooks, and in the technical literature.

Volume and page references in the International Critical Tables are as follows:

for ρ -- Organic liquids I, 176-280; Gases III, 3-80; Liquids III, 22-34; Solutions III, 51-198; Refrigerating solutions II, 327; Glues II, 410; Oils, fats and waxes II, 209; Liquid fuels II, 156-164; Gaseous fuels II, 164-167.
μ -- Gases V, 1-8; Liquids V, 10-12; Solutions V, 12-25; Fluidity - V, 25-32; Refrigerating solutions II, 328; Glues II, 220; Oils, fats and waxes II, 209; Liquid fuels II, 156-164.
K -- Gases V, 218-218; Liquids V, 226-229.

REFERENCES:

1. Heat Transmission, McAdams, p. 257.

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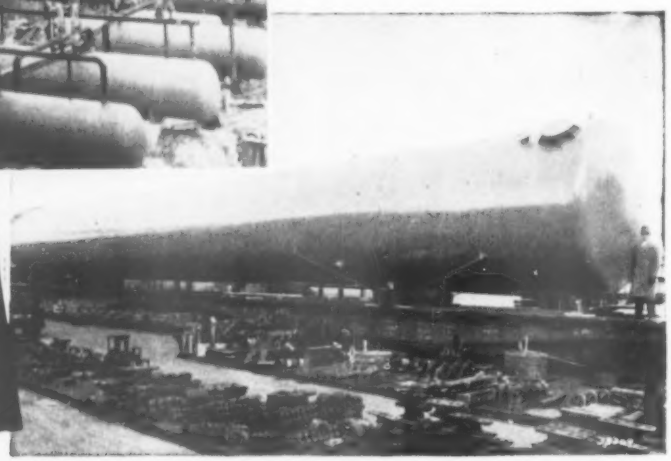

Dimensions of a number of units in this plant were limited only by railroad clearance from fabricating point to job site. The Primary Still, weighing 312,000 lbs. is the heaviest vessel installed in a natural gas processing plant, as far as we know. Most of the special fabricated equipment in the project was made in our Denver shops.

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THE STEARNS-ROGER MFG. CO. DENVER, COLORADO

EQUIPMENT MEN . . . in the News

BS&B Appoints Pool District Sales Manager

ED POOL

Lawton L. Laurence, manager oil-field sales, Black, Sivalls & Bryson, Inc., has announced the appointment of Ed Pool as Abilene, Tex., district sales manager.

Pool has been with B.S.&B. for the past 14 years. During that time he has served as salesman and branch manager at Odessa, Tex. In his new capacity Pool has supervision of sales and service activities of the oil-field division in the Abilene sales district.

Insul-Mastic Corp. Names Two Regional Managers

The Insul-Mastic Corp. of America has promoted two men to the position of regional manager. Abner H. Bagenstose has been made eastern regional manager, and John J. Miller has been placed in charge of the midwestern territory. The two men will work from the home office of Insul-Mastic in Pittsburgh.

Bagenstose has been a part of the Insul-Mastic sales staff for 5 years. His original assignment with the company was the giant refineries and chemical plants of the Texas Gulf Coast. In his new position Bagenstose will cover the states from North Carolina to Maine and westward into Ohio.

Miller was formerly an Insul-Mastic service engineer. He will cover the territory from Ohio and Kentucky westward to the Dakotas.

Rhome Is Made Regional Sales Manager for Carlon

Carlon Products Corp. recently announced the appointment of Rom Rhome as manager of sales, southwestern region of the country. Formerly associated with line-pipe sales of the Consolidated Western Division of the United States Steel Corp., Rhome will supervise the sale of Carlon plastic pipe, fittings, and coatings in the southwestern states, including Texas, Louisiana, Arkansas, and Oklahoma. He will be responsible also for the promotion of the use of Carlon pipe in the petroleum industry. His sales offices will be in Fort Worth.

Rhome's primary assignment at Consolidated Western was the sale of pipe to oil and gas pipe-line companies. Prior to this he was in the sales department of U. S. Steel Corp., Pittsburgh.

Winslow Moves Key Personnel To New Sales Headquarters

W. RAY KERN

Establishment of new sales headquarters in Murray, Ky., and the transfer of key personnel from Oakland, Calif., to the southern city have been announced by Winslow Engineering Co., manufacturer of Winslow filters and elements. Heading the group of men transferred by the company was W. Ray Kern, general sales manager. He was accompanied by his assistant, W. B. (Bill) Walker, and division sales representative, Robert A. Pelusi.

W. B. WALKER

R. A. PELUSI

Announcement of the shift was made by W. G. Nostrand, Winslow's vice president in charge of sales and engineering, who will continue to direct the company's marketing activities from the Oakland offices. Also remaining at the California plant are John Bacher, western division sales representative, and a staff of assistants.

Kern, in addition to his sales post, has also been appointed manager of the entire Murray plant, under the direction of L. L. Moore, vice president in charge of manufacturing, who makes his headquarters in Oakland.

Mid-Continent Promotes John and Hilliard

FRANK JOHN

P. Z. HILLIARD

Frank John has been appointed director of credits, and P. Z. Hilliard has been promoted to director of purchases for Mid-Continent Supply Co., President Ken W. Davis announced recently from the Fort Worth general offices of the organization.

John's new duties were assumed on his return from Washington, D. C., where he headed Mid-Continent's office established there in 1951 shortly after the Petroleum Administration for Defense was organized. As director of credits, a newly created post in the organization, John will be active in the correlation of sales and credit activities. A veteran of 22 years' service with Mid-Continent, John was director of purchases before opening the Washington office.

Prior to his promotion, Hilliard served Mid-Continent as management coordinator in the Fort Worth offices. Before that time he was New Orleans district manager for the company. Hilliard has been with Mid-Continent for 19 years.

Tuboscope Appoints Price To Executive Position

B. G. PRICE

The appointment of B. G. Price to the position of vice president, engineering and research, for Tuboscope Co., has been announced by J. W. Bozeman, president of Tuboscope.

Price joined Tuboscope in 1938, serving in field operations in Texas, Kansas, Illinois, Oklahoma, and South America. In 1947, upon his return to Houston, he assumed the position of equipment en-

gineer and later took charge of Tuboscope's fleet and equipment maintenance, design, and construction.

In his new capacity, Price will continue to act as equipment supervisor for the company and will be in charge of engineering and development on all equipment for the various services offered by Tuboscope.

McCartney, Spears Promoted To New Posts by Clark Bros.

McCARTNEY

Robert R. McCartney has been named eastern division manager and director of export operations for Clark Bros. Co., Division of Dresser Operations, Inc., Olean, N. Y. In his new position McCartney will coordinate the activities of the New York, Boston, Washington, and the new Philadelphia offices, in addition to serving as director of export operations for Clark.

R. J. SPEARS

R. C. McDONALD

Robert J. Spears has been named district manager of the company's New York office, replacing McCartney.

Before coming to Clark in 1937, McCartney had acquired 13 years of specialized compressor application experience with several well-known manufacturers. Prior to his new appointment he was New York district manager.

Spears joined the engineering department of Clark Bros. in 1938, and in 1945 he was transferred to the New York district office as sales engineer, a position he held until his recent appointment.

Clark Bros. have also announced the opening of a new office at Philadelphia, which office will be under the direction of Ralph C. McDonald. Following his graduation in 1939 from Northeastern University, McDonald acquired 10 years of experience with various pump and compressor manufacturers including Pacific Pumps, Inc. He has been associated with Clark for the past 4 years as a sales engineer out of the New York office.

Marsh Named Vice President Sperry-Sun of Canada, Ltd.

Sperry-Sun Well Surveying Co., Houston, has announced the establishment of Sperry-Sun of Canada, Ltd., with offices in Calgary, Alta. Canada. Quentin B. Marsh, who has been with Sperry-Sun since 1948, has been appointed vice president of the Canadian subsidiary.

The new Canadian company can provide complete well-surveying services.

Wheatley Announces Key Executive Changes

At a board meeting held on the thirty-seventh anniversay of the Frank Wheatley Pump & Valve Manufacturer, Frank Wheatley, Sr., was made chairman of the firm. Frank Wheatley, Jr., was elevated from his post of executive vice president to president. Charles Wheatley and Gus Baker, Jr., were added to the board and named vice presidents. Dan Lingo remains secretary-treasurer.

William J. Gray, returning from a leave of absence, has been made director of material. Leo Masching, after a short period of duty in outside sales, was named foundry superintendent. J. G. Burris, chief engineer, resigned to enter private enterprise.

In line with a newly inaugurated sales-distribution pattern for Wheatley, Ed Nolan was appointed field sales manager in charge of supply-house distribution. Wheatley has named Jones & Laughlin, Franklin Supply Co., and Bovaird Supply Co. as distributors of the company's line of pumps and valves in the continental United States. The Charles Wheatley Co. of Oklahoma, and Wheatley Equipment & Supply Companies of Texas and Canada will continue to handle the line and act as consultants.

WHEATLEY, SR.

WHEATLEY, JR.

In connection with this announcement, the Frank Wheatley board explained that the Charles Wheatley Co. of Texas has changed its name to the Wheatley Equipment & Supply Co.

In another action, the board approved the closing of the Wheatley fabrication plant, which is near the main plant property, in order to devote full attention to its primary business of manufacturing.

Tucker Appointed General Sales Manager for Unit Rig

J. T. (Tommy) Tucker, until recently general manager of sales of Emsco Manufacturing Co., has joined Unit Rig & Equipment Co., Tulsa, in the same capacity, according to an announcement made by Paul Courtney, president. Tucker joined Emsco in 1940, first as a field service man and later as sales manager of the Mid-Continent operations with headquarters in Houston.

J. T. TUCKER

R. LOUDENBACK

E. KIRBERGER

ROY SMITHEY

Working with Tucker will be Ray Loudenback who has been associated with Unit Rig since 1937, first handling service activities of the company, and at present time will serve as southern division sales manager with headquarters in Dallas. He will represent the company in Texas and other Gulf Coast states.

Earl Kirberger, formerly with Franks Manufacturing Co., and in Unit Rig's sales and service department since 1940, will be northern division sales manager working out of the Tulsa office.

Also in the Tulsa office, serving as manager of sales order department, will be Ray Smithey, who joined Unit Rig in 1949 after several years with The National Supply Co.

OCT Appoints Farrell Houston City Salesman

R. M. FARRELL

Robert M. Farrell has been named Houston city salesman and representative for Oil Center Tool Co., Rex Galloup, O-C-T sales manager, has announced.

Farrell formerly worked for major servicing companies, including Halliburton Oil Well Cementing Co., and Schlumberger Well Surveying Corp. He attended Kansas State College.

Wittich to Represent Ben F. Kelley Co.

V. R. WITTICH

Appointment of Val R. Wittich, New York, as exclusive export representative for Ben F. Kelley Co., Inc., Tulsa, has been announced by Ben F. Kelley, president. The Tulsa concern manufactures KelCo. air operated power slips, tubing tongs, breakout and spinning line catheads.

According to Kelley, the Wittich organization will represent Kelley Co. and KelCo products in all international markets except Canada and Mexico.

Pacific Pumps, Inc. Advances Graham, Harder

E. J. Weis, vice president and director of sales, Pacific Pumps, Inc., has announced the appointment of G. F. Graham as assistant sales manager to Roy A. Dunbar, general sales manager, oil-well plunger-pump division. Graham will make his headquarters at Huntington Park, Calif. D. E. Harder will succeed Graham as Mid-Continent manager.

G. F. GRAHAM

D. E. HARDER

Graham has been with Pacific for the past 20 years. During this time he has served as sales engineer, and since 1951 as Mid-Continent manager of the oil-well plunger-pump division.

Harder has been with the oil-well plunger-pump division for 20 years, the last several of which he served as assistant Mid-Continent manager. Harder will continue to make his headquarters in Tulsa.

Peabody Appoints Dunn General Sales Manager

JOHN DUNN

John Dunn, formerly in charge of burner sales for Peabody Engineering Corp., New York, has been appointed general sales manager, according to a recent announcement by Eric G. Peterson, executive vice president.

Dunn's new duties will include full responsibility for all sales divisions in the Western Hemisphere and territorial representative companies. He started as a draftsman with Peabody in 1935, becoming chief draftsman, manager of service, manager of burner division sales and assistant general sales manager.

Bethlehem Moves Louisiana Gulf District Office

Bethlehem Supply Co. has moved its Louisiana Gulf district office from New Iberia, La., to Harvey, La. J. B. Ellzey continues as district manager at the new location. This new location will enable the company to provide proper service and sales coverage for operators on lower Louisiana Gulf tideland locations.

The company has also announced several personnel promotions. J. K. Davis, formerly in the New Orleans sales office, has been promoted to division machinery sales representative with headquarters at Houston. W. J. Vark has been promoted to machinery sales representative, replacing Davis. R. M. Dabney, formerly floorman at the Houston store, has replaced Vark as field representative at McAllen, Tex.

Davis joined Bethlehem in 1944 and has served in various sales and engineering capacities since that time. He has been in the New Orleans sales office since July 1951.

Vark was formerly field representative at the company's McAllen store, and in his new position he will handle machinery sales problems in the Louisiana Gulf district.

Crockett to Head Sales Development for Mack Truck

A. G. CROCKETT

Albert G. Crockett, Mack Trucks, Inc., executive, has been appointed director of the company's newly formed sales-development division, as announced by E. G. Ewell, vice president and general sales manager. In his new capacity Crockett will coordinate the functions of public relations, advertising, sales promotion and training.

Crockett was formerly special assistant to the executive vice president and manager of public relations. He has played a leading part in Mack's public-relations campaign in behalf of truckers and the trucking industry. For several years he was manager of Mack's distributor sales organization, covering the United States, Canada, and Mexico.

Stewart is Named Branch Manager by National Supply

J. D. (Denny) Stewart has been appointed branch manager for the engine division of The National Supply Co., with headquarters in Casper, Wyo. His territory will include Montana, Idaho, Colorado, and Utah, as well as Wyoming.

Walter E. Garrard was appointed to succeed Stewart as oil-field engineer for the Northwest division. He will also have headquarters in Casper.

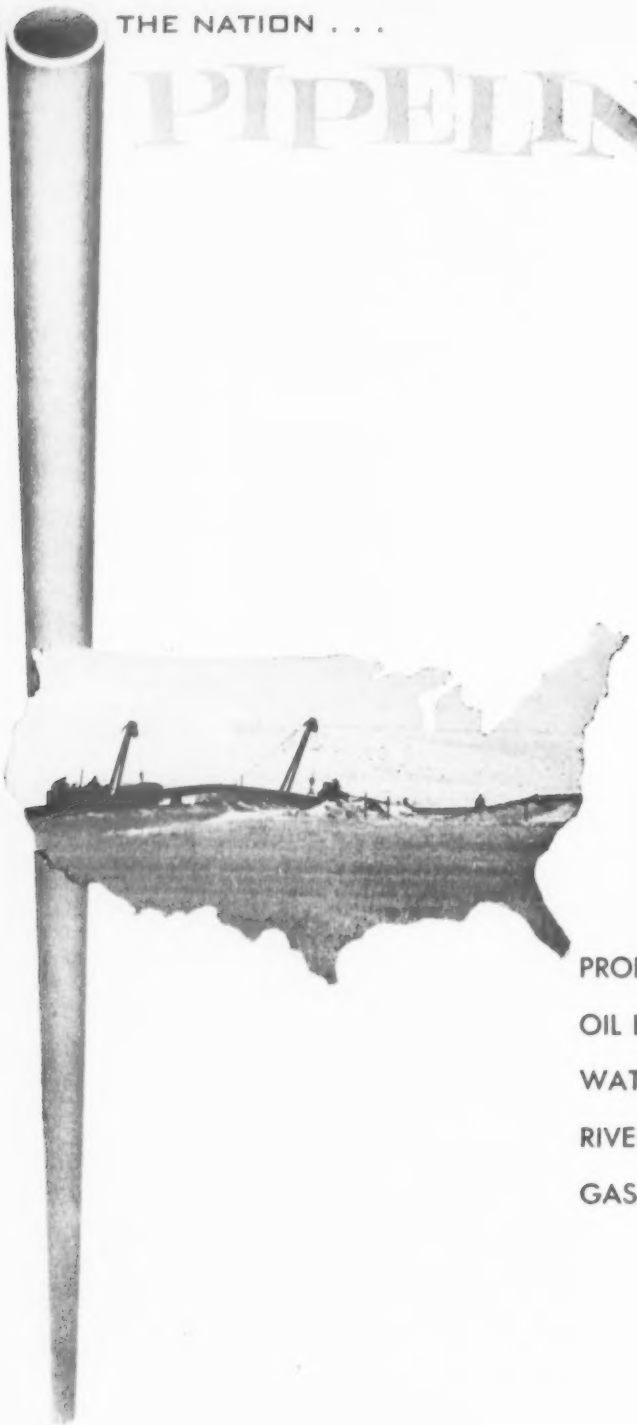
J. D. STEWART

W. E. GARRARD

Both men joined the engine division in 1942. Stewart has served as field engineer for the company's Northwest and Canadian divisions since 1948, and prior to that time had considerable experience at the engine division in Springfield, Ohio. Garrard worked on the test floor for engines at the Springfield plant prior to his promotion.

ACROSS THE NATION . . .

PIPELINES



PRODUCTS PIPELINES

OIL LINES

WATER PIPELINES

RIVER CROSSINGS

GAS PIPELINE CONSTRUCTION

R. H. FULTON & COMPANY

CONTRACTORS

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Pipe-Line Construction

PIPE-LINE activity as reported below by The Oil and Gas Journal is compiled from information received from pipe-line companies and contracting firms.

These projects include those planned, proposed, under way, and contracted. Uncontracted projects are indicated by a • preceding the company name.

Crude-Oil Pipe Lines

• **California - Oregon Pipe Line System**—103 miles 6-in., proposed, Crescent City, Calif., to Medford, Ore.

• **R. A. Goodall.**—45 miles, 6-in., planned, Little Beaver to Merino, Colo. (To connect with Sterling system).

• **Gulf Refining Co.**—55 miles, 12-in., planned. Bay Marchand to Plaquemines, La.

Humble Pipe Line Co.—71 miles, 16-18-in., under way, East Texas to Louisiana - Texas border. (30 miles of 16-in., and 41 miles of 18-in.) O. R. Burden Const. Corp. Completion date 10-53.

Under way Longview to Louisiana border.

Interstate Oil Pipe Line Co.—107 miles, 22-in., under way, Shreveport to Baton Rouge, La. River Construction Corp. 10-15.

Interstate Oil Pipe Line Co.—55 miles, 16-in., under way, Raceland to Anchorage, La. L. E. Farley.

Plaquemine to Anchorage, La.

Lakehead Pipe Line Co.—635 miles, 30-in., under way, Superior, Wis., to Sarnia, Ontario, Canada. Project managed by Bechtel Corp., Saginaw, Mich.

Superior to Wisconsin-Michigan state line. Mahoney Contr.

Under way, Michigan - Wisconsin State line through Crystal Falls to Cooks, Mich. Anderson Bros. 9-15-53.

Under way, Cooks to St. Ignace, Mich., on Straits of Mackinac. Midwestern Constructors, Inc.

Mackinaw City to Red Oak, Mich. Bechtel Corp.

Red Oak via Bay City to International Boundary south of Port Huron on St. Clair River. Conyes Const.

Water crossings of Mackinaw, Saginaw, and St. Clair rivers, Merritt-Chapman & Scott Corp., W. J. Meagher & Sons, Inc., and Midwestern Constructors.

• **Magnolia Pipe Line Co.**—29 miles, 8-in., planned. Midland County, Texas area.

Magnolia Pipe Line Co.—154 miles 16-in., under way, Corsicana to Ringgold, Tex. H. B. Zachry.

Michi, Inc.—10-in., planned, Highland, Ind. to Kalamazoo, Alma, and Elsie, Mich.

• **Pasotex Pipe Line Co.**—146 miles, 10-in., planned. Snyder to Wink, Tex.

Phillips Pipe Line Co.—26 miles, 8-in., under way, northeast area of Andrews County, Texas.

18 miles, under way, gathering lines, northeast area of Andrews County, Texas.

• **Progress Pacific Pipeline Co.**—1,100 miles, 24-in., planned, Odessa, Tex., to Los Angeles, Harbor, Calif.

• **Roosevelt Oil & Refining Corp.**—22 miles, 4 and 6-in., planned St. Helen to Norwich, Mich.

Service Pipe Line Co.—153 miles, 12-16-in., under way, Tioga-Beaver Lodge area to Mandan, N. D. O. R. Burden Const. Corp.

55 miles, 4-6-8-in., under way, Tioga-Beaver Lodge area gathering system. C. P. Battley & Son.

Texas New Mexico Pipe Line Co.—52 miles, 10-in., contracted, Dawson County to Basin System, McVean & Barlow.

Texas Pipe Line Co.—34 miles, 6-in., under way, Sour Lake to Port Arthur, Tex. Houston Contracting.

45 miles, 8-10-in., under way, between Erath and Bayou Sale stations. Houston Contracting Co.

• **West Coast Pipeline Co.**—960 miles, 20-22-in., planned, Wink, Tex., to Norwalk, Calif.

Products Pipe Lines

Augusta Pipe Line Co.—43 miles, 8-in., under way, from Arkansas City to Augusta, Kans. Ray L. Smith & Son, Inc.

• **H. W. Bass & Sons, Inc.**—152 miles, 4-6-in., proposed. Duval and Live Oak counties, Texas, to Corpus Christi, Tex.

Buckeye Pipe Line Co.—370 miles, 10-14-16-in., under way, Linden, N. J., via Allentown, Pa., to Auburn, Syracuse, Waterloo, and Rochester, N. Y. 9-53.

Guthsville to Dupont, Pa. Pipe Line Const. & Drilling Co.

Dupont north to Pennsylvania-New York state line. Fulghum Contr. Corp.

Pennsylvania-New York state line to Auburn, N. Y. Williams-Austin.

Auburn to Syracuse, N. Y. Williams-Austin.

Auburn to Caledonia, N. Y. Universal Map and Survey Co.

Evangeline Products System (Texas Pipeline Co., Gulf Refining Co., Sinclair Pipe Line Co.)—196 miles, 16-in., under way, Port Arthur, Tex., to Baton Rouge, La. Panama-Williams Corp. (line and crossings.) J. Ray McDermott Co., Inc., collaborates in crossings.

• **Great Lakes Pipe Line Co.**—Proposed, extension to Grand Island, Neb.

Harbor Products System—86 miles, 16-in., under way, Woodbury Junction, Philadelphia to Trembley Point, N. J. Construction Service Co. and H. C. Price Co. (Joint ownership of Sinclair Pipe Line Co., Gulf Refining Co., and Texas Pipe Line Co.)

• **Inland Empire Pipe Line Co.**—504 miles 10-in., proposed, Billings, Mont., to Spokane, Wash.

Kaneb Pipe Line Co.—246 miles, 8 and 10-in., under way, Wichita, Kans., to Fairmont, Neb. Ray L. Smith & Son, Inc. 9-53.

• **Phillips Petroleum Co.**—54 miles, 6-in., planned, Goldsmith to Borger, Tex.

52 miles, 10-in., planned, Shell's Brookshire system to Sweeny, Tex.

Plantation Pipe Line Co.—82 miles, 14-in., under way, Charlotte to Greensboro, N. C. Anderson Bros.

Salt Lake Pipe Line Co.—140 miles, 8-in., under way, Pasco to Spokane, Wash. Lyles & Young Co. Completion date 10-1-53.

Standard Oil Co. (Ind.)—243 miles, 10-12 in., under way, Whiting, Ind. to River Rouge, Mich.

Calumet district, Indiana, Morrison Construction Co.

Lake County, Indiana boundary to Colon, Mich., Somerville Construction Co.

Colon to Romulus, Mich. R. B. Potashnick.

Romulus to River Rouge, Mich. R. L. Coolsaet Construction Co.

207 miles, 8-in., under way, Mandan, N. D. to Moorhead, Minn. Associated Pipe Line Contrs. 12-53.

• **Sunray Oil Corp.**—440 miles, 10-in., proposed Duncan, Okla., to Mississippi River.

Sun Pipe Line Co.—50 miles, 8-in., under way, Toledo, Ohio to Inkster Junction west of Detroit. 10-53. R. L. Coolsaet Const. Co. and Poston Pipe Line Co.

• **Triangle Pipe Line Co.**—560 miles, pro-

Precision die-formed crowns interlocked with the inner liner under 40 tons pressure give more than just a "new look" to IGLOO Water Cans and Coolers. This new construction adds greater strength . . . assures better fitting lids that are easy to remove . . . provides more protection against rough handling . . . and makes IGLOO a better buy than ever. Still more news: **IGLOO Water Coolers are now available in the convenient 2-gallon size.** All coolers have **flush-mounted spigots** . . . positive protection against breaking off. Be sure you get the finest in water cans and coolers . . . be sure to say IGLOO. Your supply store has them.

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posed, Arkansas City, Ark., to Covington, Ky., and Nashville, Tenn.

• **United States Pipe Line Co.**—1,799 miles, 22-26-in., proposed, Beaumont, Tex., to Newark, N. J.

Beaumont, Tex., to Memphis, Tenn.
Memphis, Tenn., to Louisville, Ky.
Louisville, Ky., to Newark, N. J.
Laterals to Paducah and Lexington, Ky.

• **Williston Basin Pipe Line Co.**—244 miles, 8-in., proposed, Laurel-Billings, Mont., refineries to Glendive, Mont.

Wolverine Pipe Line System—200 miles, 14-in., Chicago-Toledo-Detroit. (Joint ownership of Shell, Texas and Cities Service.) Completion date 1-54.

East Chicago, Ind. to Kalamazoo River, Midwestern Constructors, Inc.

Marshall to Detroit, Mich. Anderson Brothers Corp.

Yellowstone Pipe Line Co.—(Continental Oil Co., Interstate Oil Pipe Line Co., Union Oil Co., and H. Earl Clack interest) 540 miles, 10-in., planned, Billings, Mont., to Spokane, Wash.

Natural-Gas Pipe Lines

American Natural Gas Co.—1,000 miles, 36-in., proposed, Lowry, La., to Detroit, Mich.

• **Arkansas-Missouri Power Co.** — 140 miles, 2 to 10-in., planned, St. Francis River, Clay County, Arkansas, to near Campbell, Mo.

• **Associated Natural Gas Co.**—88 miles, Missouri.

• **Atlantic Seaboard Corp.**—29 miles, 26-in., proposed, looping along Cobb-Rockville line.

• **Carolina Natural Gas Corp.**—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

• **Chattahoochee Natural Gas Co.**—70 miles, proposed, Floyd County, Georgia to Dalton, Ga.

• **Chicago District Pipe Line Co.**—35 miles, 24-30-in., proposed, Chicago area.

• **Cities Service Gas Co.**—18 miles, 16-in., Lawrence and Newton counties, Missouri.

69 miles, 20-16-in., proposed, Cleveland, McClain, and Garvin counties, Oklahoma.

• **City of Fayette, Ala.**—20 miles, 5-in., proposed, Fayette, Ala., to Southern Natural's system in Tuscaloosa County, Ala.

• **Coast Counties Gas & Electric Co.**—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

• **Colorado Interstate Gas Co.**—365 miles, 22-in., proposed, Green River, Wyo., to Denver, Colo. 1954.

243 miles, 4 to 20-in., planned, Colorado, Oklahoma, Texas, and Kansas.

• **Cumberland and Allegheny Gas Co.**—31 miles, 12-in., proposed, Garrett County, Md., to Keyser, W. Va.

East Tennessee Natural Gas Co.—158 miles, 16-in., under way, Knoxville to Kingsport, Tenn. (58 miles of laterals.) 11-53.

• **El Paso Natural Gas Co.**—1,178 miles, proposed, Permian basin, New Mexico, Texas and Colorado.

El Paso Natural Gas Co.—771 miles, 30-in., under way, Plains, Tex. to Kingman, Ariz. 567 miles contracted by Oklahoma Pipe Line Constructors, R. H. Fulton and Co. and Western Pipe Line Contractors. 204 miles to be built by El Paso Natural construction organization.

• **Fort Worth Basin Gas Co.**—Planned, Novice, through Brown and Comanche counties, Texas.

• **Glacier Gas Co.**—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

Gulf Interstate Gas Co.—860 miles, 30-in., under way. Acadia Parish, La., to Boyd County, Ky. H. C. Price and Houston Contracting. 11-54.

Under way, Rayne, La. to Kincade, Tenn. Houston Contr.

Under way, Gordonsburg, Tenn., to Catlettsburg, Ky. H. C. Price Co.

230 miles, gathering lines, contracted, Associated Pipe Line Contractors, Anderson Bros., Williams Bros.

329 miles, 12 to 24-in., proposed. Laterals off Acadia Parish, Louisiana, to Boyd County, Kentucky, line.

• **Home Gas Co.**—32 miles, 12-in., planned. Breesport to Union Center, N. Y.

17 miles, 12-in., proposed, loops from Hansock to Sanford, N. M.

Home Gas Co.—46 miles, 12-in., under way, Tioga and Broome counties, New York. H. L. Gentry Const.

22 miles, 12-16-in., under way, Binghampton, N. Y.

• **Interstate Power Co.**—26 miles, 8-in., proposed, from Nat. Gas P. L. Co. America line near Hooppole, Ill., to Clinton, Ia.

Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., start last half '53, Washington County to Cedar Rrapids, Iowa.

• **Kansas-Nebraska Natural Gas Co.**—41 miles, 10-12-in., proposed, Kansas and Nebraska.

Kansas-Nebraska Natural Gas Co., Inc.—54 miles, 4-6-in., under way, Neligh to Hartington, Neb. Brodie Constr. 9-53.

42 miles, 4-6-in., under way, Neligh to O'Neil, Neb. Brodie Const. 9-53.

61 miles, 3-2-in., under way, lateral lines from Broomfield through various towns to Wausa, Neb. Brodie Const. Co. 9-53.

• **Lone Star Gas Co.**—100 miles, pro-

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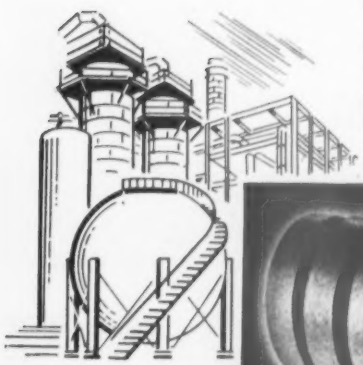

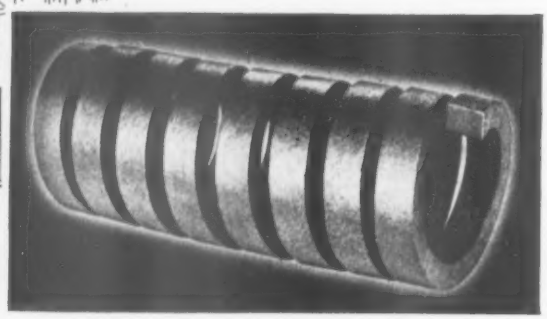

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R/M Teflon* Braided and Plastic Packing ... For use against chemicals

*Du Pont trade-mark for its tetrafluoroethylene resin

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PACKING DIVISION, MANHEIM, PA.

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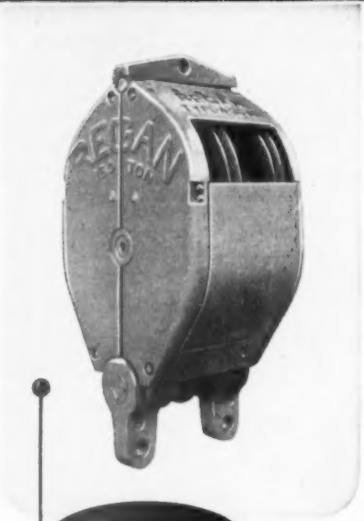

Regan type **A**

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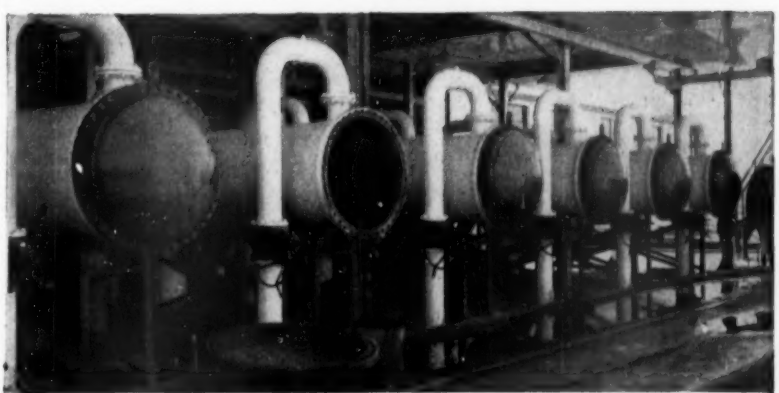

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posed, storage fields to the Dallas-Fort Worth area.

35 miles, 12-in., proposed, southeastern Schleicher County.

36 miles, 12-in., planned, Stamford to Abilene, Tex.

Lone Star Gas Co.—44 miles, 12-in., under way, Red Springs, Woods County to Sulphur Springs area, Hopkins County, Texas.

• **Manufacturers Gas Light & Heat Co.**—40 miles, proposed, Allegheny, Washington, and Beaver counties, Pennsylvania.

213 miles, 3 to 26-in., proposed, various points on system in Pennsylvania, West Virginia, and Ohio.

72 miles, 16-20-in., proposed, Doddridge, Wetzel and Marshall counties, West Virginia.

• **Mississippi River Fuel Corp.**—109 miles, 10-18-in., planned, laterals in Woodlawn and Waskom gas fields, Texas.

Missouri Central Gas Co.—25 miles, 6-in., contracted, Moberly to Macon, Mo. L. R. Young Const. Co.

• **Missouri Public Service Co.**—136 miles, 8-10-in., proposed, New Franklin to Trenton, Mo.

24 miles, 10-in., Johnson County to Clinton, Mo.

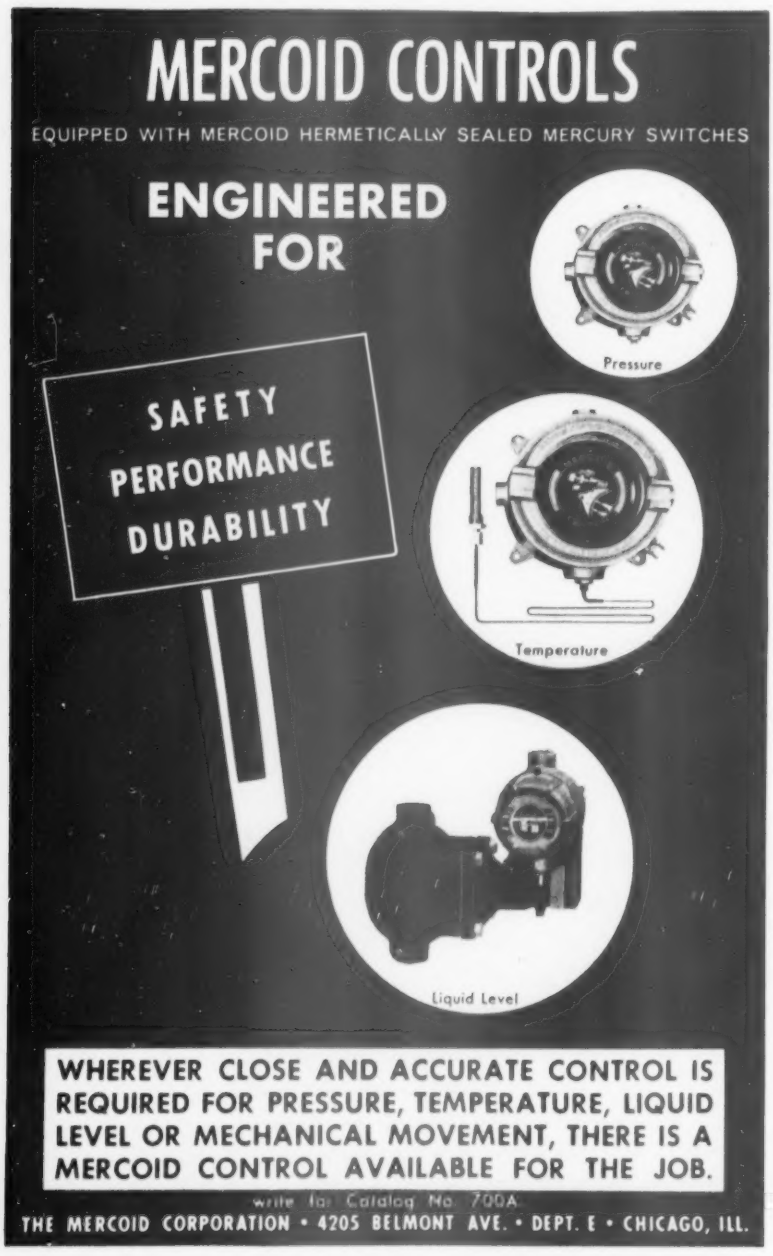
• **Montana Power Co.**—52 miles, 16-in., planned, Canada - Montana border to Cut Bank, Mont.

• **Morganfield Natural Gas Co.**—31 miles, 4-6-in., planned, through Sturgis, Providence, Clay, Diamond, Wheatcroft, and Sullivan, Ky.

• **Natural Gas Producer Inc.**—100 miles, 12-in., planned, Yenter pool to Denver, Colo.

• **Nevada Natural Gas Pipe Line Co.**—114 miles, 12¾-in., proposed, Topock, Ariz., to Las Vegas, Nev.

• **New River Gas Co.**—50 miles, planned, Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.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• **New York State Electric and Gas Co.**—59 miles, 8-10-24-in., proposed, Oneonta and Norwich to DeRuyter, N. Y.

• **Northern Indiana Fuel & Light Co.**—33 miles, 8-in., proposed, Edgerton to Auburn, Ind.

• **Northern Natural Gas Co.**—458 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska, Iowa and Minnesota to connect with Permian Basin System.

475 miles, proposed branch lines to Iowa, Nebraska, Minnesota and South Dakota.

Northern Natural Gas Co.—Section No. 1, 92 miles, 30-in., under way, Dumas via Sunray to main line north of Canadian River, Texas, and two loops near Beaver station, Oklahoma, R. H. Fulton & Co.

Northern Natural Gas Co.—Section 2, 70 miles, 30-in., contracted, loops near Mullinville, Bushton and Clifton stations, Kans., and Palmyra station, Neb. Lone Star Constructors.

Northern Natural Gas Co.—Section 3, 94 miles, 24-in., and 30-in., contracted loops near Paulina, Ogden, and Oakland stations, Iowa, G. G. Griffis Construction Co.

• **Northwest Natural Gas Co.**—750 miles, planned, Washington, Oregon, and Idaho.

24-in., Eastport, Idaho, to Monroe, Wash.

18-in., Monroe to International boundary near Lynden, Wash.

22-in., Monroe to near Seattle, Wash.

20-in., Seattle to Portland, Ore.

• **Ohio Fuel Gas Co.**—31 miles, 20-in., planned, Licking County to Richland County, Ohio.

22 miles, 16-in., planned, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., planned, Wellington to Elyria, Ohio; 16 miles, 20-in., planned, Benton Station to Crawford Station; 18 miles, 20-in., Crawford Station to near Columbus; 16 miles, 16-in., planned, Berlin to Sandusky, Ohio.

74 miles, 3 to 20-in., planned, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., planned, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, planned, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

69 miles, 20-24-in., proposed, lines to tiein Gulf Interstate line along various points in Lawrence, Jackson, Vinton, Hocking and Fairfield counties, Ohio.

• **Pacific Gas & Electric Co.**—50 miles, 12-16-20-in., planned, Fresno to Merced, Calif.

(Section 2) 20-in., Holm to Topock-Milpitas line.

(Section 3) 12-in., parallel existing Madera-Livingston line, planned. Napa Wye to Shellville; Cotati to Santa Rosa, Calif.

170 miles, 34-in., proposed, main-line loops along Topock, Ariz., to Milpitas, Calif.

Pacific Gas & Electric Co.—86 miles, 34-in., under way, parallel sections along Topock-Milpitas line. Engineers Pipe Line, Ltd. Summer 1953.

• **Pacific Northwest Pipeline Corp.**—1,466 miles, proposed, Ignacio, Colo., to Bellingham, Wash.

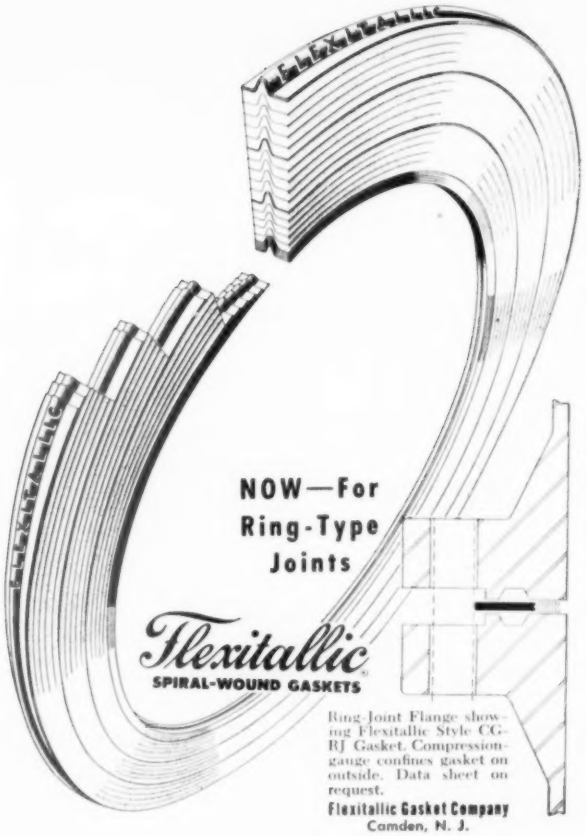
380 miles, proposed, laterals and spurs off main line to Pocatello, Idaho, to Yakima, Wash.

Permian Basin Pipeline Co.—280 miles, 16-24-26-30-in., under way, West Texas and New Mexico. R. H. Fulton & Co.

Public Service Co. of Colorado—34 miles, under way, Douglas Creek and other gas fields to Grand Junction, Colo., area. Foutz & Buraum Const. Co. 9-1-53.

• **Rockland Light & Power Co.**—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

• **Shenandoah Gas Co.**—39 miles, 3-4-8-in., proposed, Middleton, Va., to Martinsburg, W. Va.



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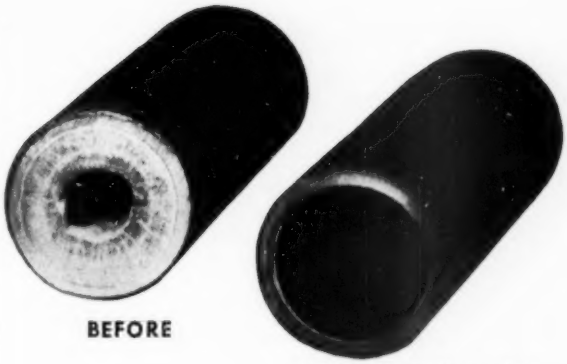

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Signal Oil and Gas Co.—170 miles, 3½-34 in., under way, Tioga-Beaver Lodge gathering system. Completion date 9-53.

• **South Carolina Natural Gas Co.**—160 miles, 16-12-10-in., proposed, Aiken, S. C., to cities of Columbia, Summerville, and Charleston, S. C.

• **South Georgia Natural Gas Co.**—539 miles, 2-12-in., planned, Phoenix, Ala., to Tallahassee, Fla. (a) 12-in., Phoenix, Ala., to Albany, Ga., (b) 10-in., Albany, Ga., to Moultrie, Ga., (c) 8-in., Moultrie, Ga., to Tallahassee.

• **Southern California Gas Co., and Southern Counties Gas Co.**—73 miles, 30-in., planned, loops on main line from Blythe to Los Angeles.

Southern Natural Gas Co.—1,235 miles, 24 to 4½-in., under way, Louisiana, Mississippi, Alabama, and Georgia, and South Carolina. Houston Contracting and H. C. Price. Fall 1953.

Under way, Mississippi, Alabama, and Georgia.

Gwinville, Miss., to Lake Pontchartrain, La. Houston Contr. 8-53.

Bass Junction, Ga., to South of Wrens, Ga., Houston Contr. 9-53.

• **Southwest Gas Corp., Ltd.**—26 miles, proposed, from P.G.&E. line to Victorville, Calif.

• **Tennessee Gas Transmission Co.**—574 miles, 30-in., proposed, Kinder, La., northeast through Louisiana, Mississippi, to Portland, Tenn.

130 miles, proposed, looping in Texas and Louisiana. Including 67 miles of 30-in. line.

63 miles, 26-in., proposed, loop near Greenup, Ky., and Mercer, Pa.

45 miles, 20-in., proposed, Buffalo, N. Y., to the U. S.-Canadian border Hamburg station near St. Catherines.

Tennessee Gas Transmission Co.—20 miles, 30-in., under way, Nachitoches, La., to Goldonna, La. Oklahoma Contracting Co.

18 miles, 30-in., under way, Middletown to Selmer, Tenn. Oklahoma Contracting Co.

35 miles, contracted, Campbellsville, Ky., to Danville, Ky. Western Pipe Line Constructors.

21 miles, 26-in., under way, Carter, Ky., to Ohio River. Western Pipe Line Constructors.

60 miles, 24-in., under way, Pigeon, Pa., to Hebron field, Porter County, Pennsylvania. Bechtel Corp.

• **Texas-Ohio Gas Co.**—1,435 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va.

• **Trans-Northwest Gas, Inc.**—246 miles, proposed, International Boundary near Osoyoos, B. C., to Washington and Idaho.

275 miles, branch lines.

• **United Gas Fuel Co., and Central Kentucky Natural Gas Co.**—92 miles proposed, Gulf Interstate system, Boyd County, Ky., to Putnam County, West Virginia.

• **United Fuel Gas Co.**—50 miles, 20-24-in., proposed, Wood County to Lanham, W. Va. Spring 1954.

32 miles, 24-in., proposed, near Ripley, W. Va., to Lanham station, Putnam County, W. Va.

60 miles, 30-in., proposed, Lanham in Kanawha County, West Virginia, to Gulf Interstate line in Boyd County, Ky.

• **United Gas Pipe Line Co.**—44 miles, 20-in., planned, Lirette field to Harvey, La.

• **United Natural Gas Co.**—50 miles, 12-in., planned, Elk County to Jefferson County, Pennsylvania.

• **Utah Natural Gas Co.**—103 miles, 16-18-in., proposed, Clear Creek field near Price to Salt Lake City, Utah.

18-in., Clear Creek to Provo, Utah.

16-in., Provo to Salt Lake City, Utah.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Warren Petroleum Corp.—78 miles, 2-24-in., proposed, Lovington, N. M. Completion date 9-53.

Westcoast Transmission Co., Ltd.—(See foreign natural gas pipe lines).

Western Slope Gas Co.—34 miles, 8-in., under way, Garmesa to West Douglas Creek, Colo. 8-53.

Foreign Crude-Oil Pipe Lines

Basrah Petroleum Co.—65 miles, 24-in., under way, Zubair to Fao, Iraq. Completion date 10-53.

Bombay Port Trust.—50 miles, 8 to 24-in., contracted, Bombay, India, to serve Standard Vacuum Oil Co., and Burmah Shell refineries. Merritt, Chapman & Scott Corp., contractors. (Crude and Products.)

• **Creole Petroleum Corp.**—25 miles, 34-in., planned, Lagunillas to La Salina (State of Zulia, Venezuela.)

Direccion General de Yacimientos Petroliferos Fiscales—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

• **Gaz de France**—200 miles, 12-in. Ruhr to Paris, France.

Interprovincial Pipe Line Co.—135 miles, 24-in., under way, looping from Regina to U. S. border, Canada. Anderson International Contrs., Ltd. 8-53.

• **Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

72 miles, 12-in., proposed, Poza Rica to Atzacapotzalco, Mexico.

Petroleos Mexicanos.—125 miles, 10-in., under way, Jose Colomo to El Plan, Mexico.

• **Saskatoon Pipe Line, Ltd.**—56 miles,

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6-in., planned, Milden to Saskatoon, Sask.

Texas Petroleum Co.—60 miles, 4-6-in., under way, Pta. Nino to La Dorada.

● **Trans Mountain Oil Pipe Line Co.**—30 miles, planned, Vancouver, B. C., terminal to Ferndale, Wash.

Trans Mountain Oil Pipeline Co.—711 miles, 24-in., under way, Edmonton, Alta., to Vancouver, B. C. Canadian Bechtel, Ltd., engineers. Completion date 8-53.

Edmonton to Acheson, Canadian Pipe Line Const. 8-53.

Jasper to Blue River, B. C., Comstock Midwestern. 8-53.

Blue River, B. C., to Coquehalla, B. C., Mannix, Ltd. 8-53.

Chilliwack to Coquehalla, B. C. Comstock Midwestern. 8-53.

Sumas to Vancouver, B. C., Comstock Midwestern. 9-53.

● **Yacimientos Petroliferos Fiscales Bolivianos.**—170 miles, 4-in., planned, Bermejo to Tupiza, Bolivia.

Foreign Products Pipe Lines

Columbian Ministry of Petroleum—115 miles, 4-in., begin 1953, La Dorado to Cartago, Colombia, Williams Bros. Engineers.

93 miles, 8-in., begin 1953, Cantimplora to Dorado, Colombia, William Bros. Constructors.

● **Empresa Nacional del Petroleo**—80 miles, 6⅝-in., planned, Concon to Santiago, Chile.

Empresa de Ferrocarriles Ecuatorianos.—50 miles, 6-in., contracted, Guayaquil to Palmira, Ecuador. J. A. Jones, contractor; C.R.C. Engineering Co., engineers.

● **Governments of Southern Rhodesia and Portuguese East Africa.**—200 miles, considered, Beria, Portuguese Mozambique to Umtalia, Southern Rhodesia.

North Atlantic Treaty Organization (NATO)—1,920 miles, 4-10-in., to serve military bases in Western Europe (to connect with U. S. Government's St. Nazaire-Paris-Metz line.) Contracted by Soc. Foster Wheeler Francaise.

● **Petroleos Mexicanos.**—124 miles, 6-in., planned, Lagos to Guadalajara, Mexico.

54 miles, 6-in., planned, Lagos to Aguascalientes, Mexico.

82 miles, 8-in., planned, Salamanca to Lagos, Mexico.

Shell Co. of Australia.—34 miles, 8-in., under way, Geelong, Melbourne Ref. to connect with installations at Newport, Australia. Taylor Woodrow. 11-53.

Sun-Canadian Pipe Line Co., Ltd.—200 miles, 8-in., under way, Sarnia, Hamilton, Toronto, Ont. Williams Bros. 10-53.

● **United States Government.**—375 miles, 12-in., planned, St. Nazaire to Melun and Metz, France.

Foreign Natural-Gas Pipe Lines

● **Azienda Generale Italiana Petroli.**—110 miles, 12-14-16-in., Start 11-52. Cortemaggiore to Genoa. Completion date 11-53.

Azienda Generale Italiana Petroli—90 miles, 12-in., under way, Cortemaggiore to Bologna, Italy, SNAM crews.

120 miles, 16-in., under way, Cremona Porto Mar to Ghera, Italy, Montubi, contractor.

40 miles, 12-in., under way, Ripalta-Bergamo, Italy.

Dirrecion General del Gas del Estado—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

● **Empresa Nacional del Petroleo**—80 miles, 10-in., planned, Concon to Santiago, Chile.

● **Mid-Continent Pipelines, Ltd.**—1,860 miles, 30-in., proposed, Alberta to Montreal, Canada. Fish Engineering Co.

● **Northwest Natural Gas Co.**—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

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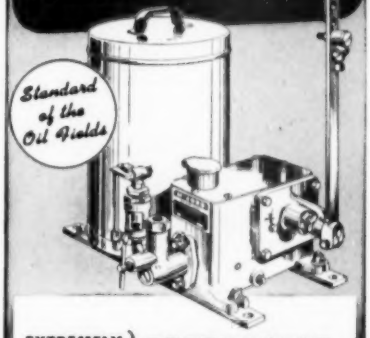

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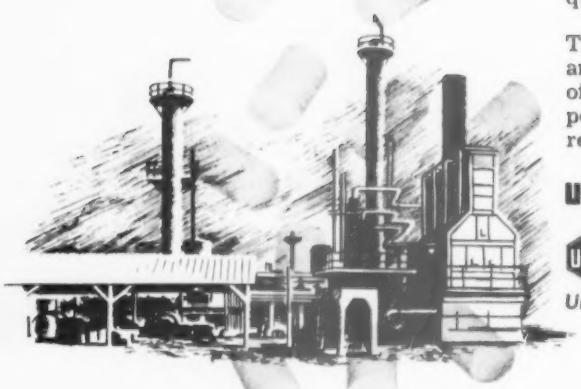
NEW PLATINUM CATALYST PLANT FOR ENGLAND

Universal Oil Products Company has taken an important step to provide adequate quantities of the revolutionary UOP Platforming catalyst in sterling.

Universal and the widely known platinum refining firm of Johnson, Matthey & Company, Limited have formed a subsidiary in England to manufacture and market platinum catalyst. The new company will be known as Universal-Matthey Products, Limited.

Originated and developed by Universal, this platinum catalyst was the very first ever to be offered to the petroleum refining industry. Its effectiveness has been proved through commercial operation in the production of thousands of barrels of both premium gasoline and aromatics from petroleum by the Platforming process. Discovered by Universal, Platforming was the first reforming process to utilize a platinum catalyst to improve the quality of gasoline, and to produce commercial quantities of benzene, toluene and xylenes.

This new catalyst manufacturing plant is but another example of Universal's continuing program of progress designed to offer the broadest possible service to the world-wide petroleum refining industry.



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TRADE LITERATURE

1 SPEEDOMAX GAS-ANALYSIS EQUIPMENT FOR THERMAL CONDUCTIVITY MEASUREMENTS, an eight-page folder, gives complete information about electronic Speedomax recorders and controllers used with L. & N. cell assemblies. Folder lists performance characteristics and describes many design features of both Speedomax instruments and L. & N. cell assemblies. It also shows how equipment incorporates thermal conductivity method for accurate measurements. Specifications and gas analysis data sheet are included. *Leeds & Northrup Co.*

2 IDEAL TYPE E-700 POWER SLUSH PUMP, rated at 700 hp. output, is described in a new profusely illustrated, 20-page bulletin, which covers design and construction features with many pictures of individual working parts of the company's largest slush pump, its performance with six liners, and specifications. Dimensions are given on double-page line drawings. *The National Supply Co.*

3 CORROSION RESISTANCE OF COPPER AND COPPER ALLOYS. This 28-page booklet explains chemical and physical nature of corrosive attack in its various forms. Included is a tabulation indicating relative corrosion resistance of principal types of copper and copper base alloys when in contact with 183 different corroding agents. *The American Brass Co.*

4 INSIDE AND OUT is a catalog which presents in a unique way four diesel-powered A.-C. Crawler tractors. Catalog shows details of construction of each model with full cutaway pictures, and variety of applications of each on the job. As the pages are turned, a spread of cross-sectional views with job application illustrations is found for each model. When completely opened, the four tractors in cross-section are on view. *Allis-Chalmers Manufacturing Co.*

5 TELEMETER MULTIPLEXING SYSTEM. This bulletin explains multiplexing transmitting and receiving system for use with metameter telemeters. It also describes use of the new system for transmitting up to 15 readings (over a single circuit and distance) of pressure, vacuum, temperature, flow, water, or liquid level, static and differential pressure, motion, voltage, current, or totalized load taken at separate locations or areas to metameter receiving instruments. *The Bristol Co.*

6 STOP BREATHING is an attractive multicolored loose-leaf folder describing Guiberson's H-2 hydraulic anchor with automatic action for pumping wells. Setting and pulling procedures with illustrations are discussed. Folder contains price lists on hydraulic pump anchor and accessories, together with engineering data. *The Guiberson Corp.*

7 U. S. GOVERNMENT AERIAL PHOTOGRAPHY. Information is available on integrated, personalized services in search, ordering reporting, and delivery follow-up on U. S. Government aerial photography for geological uses; how this service works; and service charges, as well as explanation of foreign aerial photography. *Washington Commercial Co.*

8 BAKER WALL SCRATCHER. Bulletin 303 describes and illustrates reciprocating-type wall scratcher

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For further information—without obligation—I have checked numbered circles above

Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Aug. 24, 1953

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for controlled removal of mud cake to obtain a better primary cement job. Mounting and ordering instructions with wire length table are discussed. *Baker Oil Tools, Inc.*

9 ELECTRONIC REMOTE READING LIQUID LEVEL GAGING EQUIPMENT. Bulletin CP-3003 features new relay type selective receivers in 36, 48 and 60 tank capacity models with key-type selector switches rather than conventional dial selector. Cabinet and case dimensions are shown. *Vapor Recovery Systems Co.*

10 INDUSTRIAL V-BELT CATALOG, a V-belt power-transmission guide, contains horsepower ratings for both standard and Hy-Load premium V-belts, and also two new correction factors for use in designing a V-belt drive. A page each is devoted to standard sheave sizes and standard groove dimension sheaves. New revised preengineered drive tables for quick calculation, and engineering data on general duty V-belts are included. *Durkee-Atwood Co.*

11 BULLETIN NO. 1450 describes and illustrates a line of d.c. motors, ½ to 300 hp., and d.c. generators, ¾ to 250 kw. Bulletin is fully illustrated and photographs and cutaway drawings show details of d.c. mechanical construction, available d.c. motor enclosures for different operating conditions, and d.c. motor applications. Bulletin also includes a section on motor-generator sets for converting alternating current to direct current. *Louis Allis Co.*

12 INDUSTRIAL JOBS FOR AIR HOSE. This bulletin describes a number of different uses for line of air hose, which uses vary from heavy-duty construction through digging and drilling operations, to many heavy and light industrial and commercial uses for air hose. Bulletin includes cross-section and cutaway photos, as well as performance data, constructions, sizes, weights, working pressures, and recommended uses. *Quaker Rubber Corp., Div. of H. K. Porter Co., Inc.*

13 A PROPOSAL FOR MANAGEMENTS WITH VISION is the title of a new brochure which describes a unique, specialized engineering service for making plant operations automatic. This service consists of consultation, analysis, design, and construction in the automatic control field. *CDC Control Services, Inc.*

14 PLIBRICO REFRACTORY PRODUCTS is a 44-page, multicolored brochure describing refractory products and construction methods for such units as horizontal heaters, vertical heaters, vapor separators, catalyst regenerators, transfer systems, stacks and breechings. Bulletin includes installation photographs and condensed specifications. *Plibrico Co.*

15 FASTENINGS OF HIGH TEMPERATURE AND CORROSION RESISTANT ALLOYS is an informative 15-page bulletin on high-temperature alloys such as refractaloy, discaloy, inconel, and hastelloy alloys, with a special section on titanium. Bulletin contains section on characteristics of high-temperature bolting. Tables give mechanical properties and chemical composition of various alloys and illustrate many types of fastenings produced from super alloys and titanium. *The H. M. Harper Co.*

16 PANELGRAPHS THROUGHOUT INDUSTRY. The growing importance of panelgraphs in a broad range of industrial control applications is revealed in this multi-colored brochure. Bulletin pictures several typical panelgraph applications in power stations, petroleum refineries, chemical and process industry applications. Various techniques of graphic symbolism are illustrated. *Panellit, Inc.*

17 INSTRUMENTS FOR GAS SPECIFIC GRAVITY MEASUREMENT. Catalog 14-A-12 describes gas specific gravity measurement and control systems using the combination of Ranarex and Fischer & Porter instruments. Catalog covers components of the system, details several applications, lists general specifications for specific gravity ranges, and gives a breakdown of equipment required for either transmitting-recording or transmitting - recording - controlling installations. *Fischer & Porter Co.*

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Aug. 24, 1953

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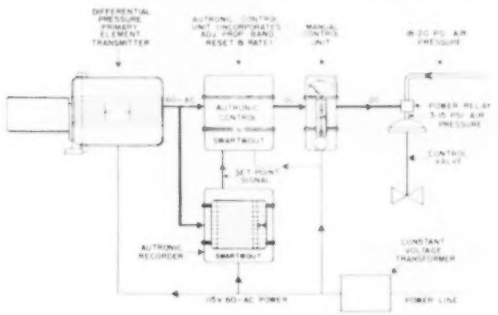
DIGEST OF NEW EQUIPMENT

IT'S NEW ✓ CHECK IT

by Dan B. Miller

18 TWO NEW AUTRONIC PACKAGES for controlling and/or recording differential pressures or flow are built around basic components of the all-electronic autronic control system. The heart of each package is the D2T differential pressure transmitter which covers a range

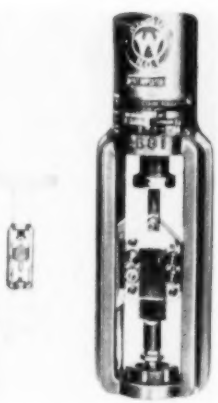


of from 0-20 to 0-200 in. water at static pressures up to 5,000 psig. with full overrange protection. The recording package consists of the type D2T primary element transmitter, Type A2R miniature strip chart recorder, and a constant voltage transformer. The controlling and recording package also includes these units as well as a Type A3C controller with proportional band and automatic reset, M2C manual control, and P2R power relay. Among advantages are accurate and instantaneous response of all-electronic operation, negligible zero shift, unrestricted location of components, flexibility to adapt it to many different process requirements and interchangeability of components without need for recalibration. *The Swartwout Co.*

IT'S NEW ✓ CHECK IT

19 TRUCK-MOUNTED DITCHING MACHINE WITH JACKKNIFE BOOM. The new design greatly reduces the head room of the machine, permitting it to travel beneath any underpass or other obstacle that provides clearance for the truck. The new boom also permits extending the bucket line at an angle behind the machine, to start the ditch flush against walls or embankments. When digging along a slope, the boom and bucket line remain in a vertical position, thus maintaining the original vertical ditch walls regardless of the angle at which the truck is running. The standard Earthripper digs ditches from 8 to 24 in. wide, from ground level to 6 ft. deep. On special order, machines for digging 8 ft. deep can be supplied. The Earthripper derives its power from the truck motor, through an improved transmission system that permits the differential of the truck to be perfectly synchronized with the bucket line. Digging speeds from 1 to 44 ft. per minute are obtained, with the speed of the bucket line variable to meet conditions. Road speed of the unit is actually the road speed of the prime mover, with 50 m.p.h recommended as a maximum for reasons of safety. *Owen-Pewthers Manufacturing Co.*

IT'S NEW ✓ CHECK IT



20 THOMAS MAGNA-STROKE, a new development in regulating valve design, is a gear train working at a ratio of 2 to 1, giving twice the stroke at the inner valve as at the diaphragm. Fluids, gas vapors, or liquids which are to be maintained automatically at a desired pressure within a close limit can be maintained at half the variation due to Magna-Stroke action of doubling the pressure effect. Valves energized by pilot instruments responding to pressure or temperature changes in the system, respond twice as fast. This is because only half as much change is required at the Magna-Stroke valve diaphragm to give the same effect at the inner regulating valve, as would be given with a conventional valve. Since pressure change required to actuate a valve diaphragm is less when the Magna-Stroke valve is used, a smaller diaphragm is possible. The increased ratio of the Magna-Stroke valve effects double the opening at the inner valve, thus better control is achieved. When Magna-Stroke action is reversed the effect achieved at an inner valve is

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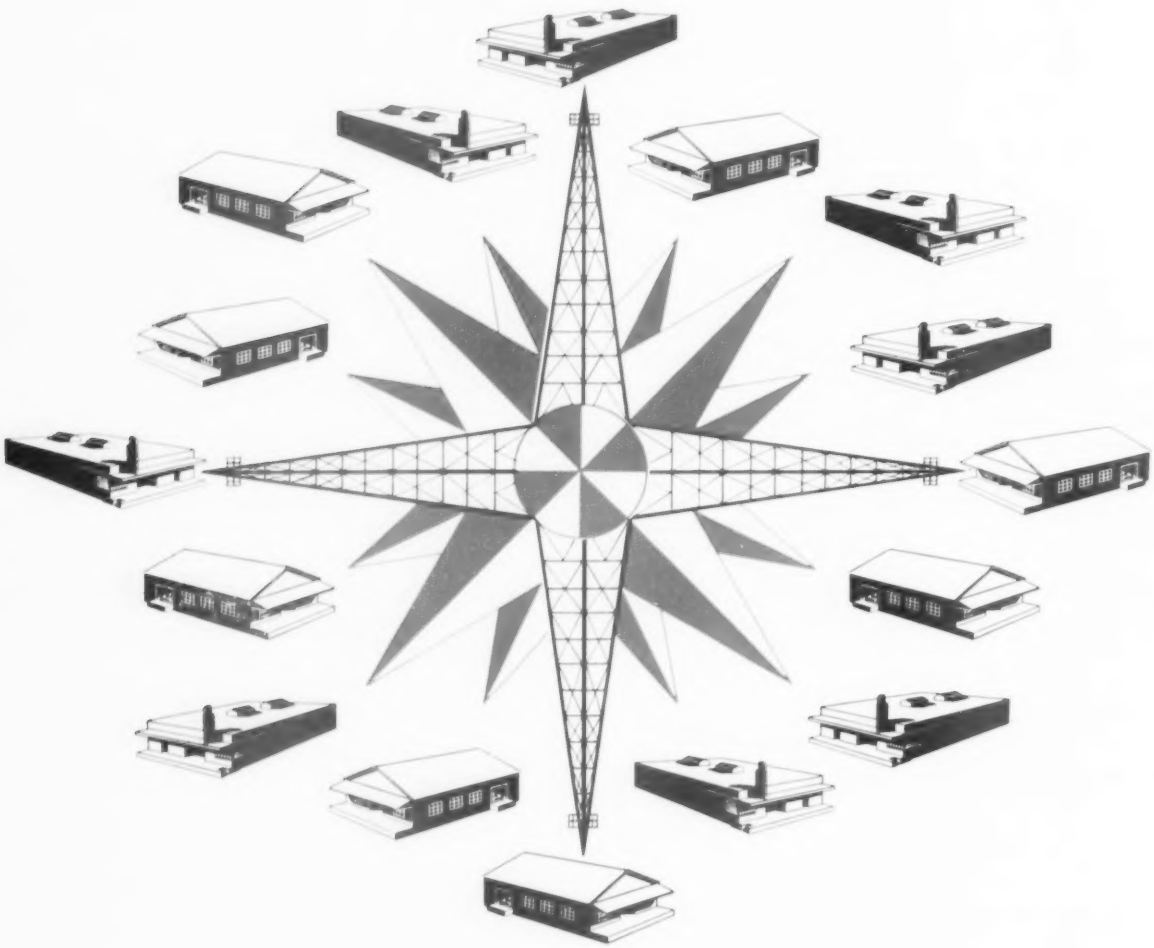

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that of double the power. Thus in instances where high pressure is involved, as when used with a single port valve, a positive shutoff is obtained. *Natural Gas Equipment, Inc.*

IT'S NEW CHECK IT

21 HYDRAULIC CRANE. Combining the best features of crawler, truck, and erection cranes with those of industrial shop cranes, the new machine is self-propelled and hydraulically operated. Four functions are involved:

turntable rotation, boom elevation, raising and lowering of cable and hook, and power extension and retraction of the boom. All movements including steering, are actuated by hydraulic power. Other features are 360° boom rotation; 24-ft. horizontal reach from center of rotation; 24-ft. vertical lift from ground level to hook; ability to negotiate grades up to 20 per cent, under full load; and 15 m.p.h. road speed under full load. The crane's over-all height of 9 ft. and over-all width of 8 ft. will meet door and aisle requirements in the vast majority of cases. *Austin-Western Co.*

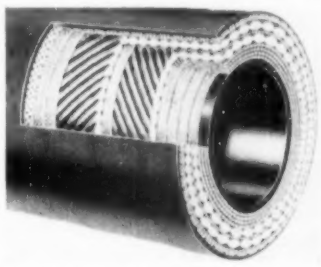
IT'S NEW CHECK IT

22 NEW FIVE-BOLT LINE BLIND VALVE. A new 18-in. line blind valve will accommodate larger pipe lines. The new line blind has an A.S.A. rating of 150 lb. for working pressures up to 230 lb. It provides either a full-diameter, smooth, round opening, or a permanent, leakproof shutoff. Service life is practically unlimited and maintenance is negligible. The neck of the spectacle plate on the valve is suspended on the top bolt so that it can be revolved in either direction when opening or blinding the line. The two side bolts on the valve swing out (see inset) thereby making it unnecessary to remove any bolts when reversing the spectacle plate. Easily operated by one man, the five bolts on the 18-in. model are quickly spread and tightened, even in close-coupled, compact manifolds. The bar-operated bolts eliminate wedges, hammers, and wrenches needed for spreading conventional flanges. The five bolts are large enough in diameter to meet pressure requirements. Regularly constructed of carbon steel, the five-bolt, 18-in. line blind valves can be made of other materials for special requirements. Standard packings on

the valves are Hycar, a highly resistant synthetic rubber. This packing will perform satisfactorily in most services where the temperature is not too high and will last almost indefinitely under normal service conditions. Other packing materials are available to meet specific requirements. *Homer Oil Tool Co.*

IT'S NEW CHECK IT

23 IMPROVED ROTARY HOSE is designed to withstand 5,000 lb. test pressure. It is known as Ray-Man CBL Rotary Hose and is made with a special cable wire insertion. Features claimed after prolonged field tests are extreme flexibility and strength with a high factor safety. It also has a synthetic oilproof rubber tube for drilling in with oil or oil-base mud. Another feature is a new builtin streamlined coupling with a Lip-Lok leakproof seal. *Raybestos - Manhattan, Inc.*

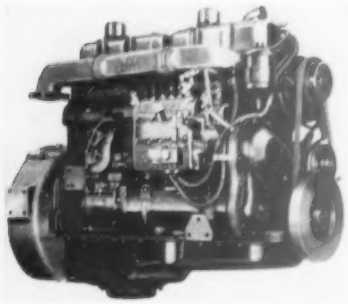


IT'S NEW CHECK IT

24 COMBINATION JAR AND KEYSEAT REAMER is primarily for use in directional drilling. This tool is constructed in such a manner that it may be used to jar as well as ream. Simple in construction, the tool consists basically of two parts; the mandrel with a box end up and pin end down, and a sleeve with hard-faced reaming blades. The sleeve is free moving, independent of the mandrel. The tool is run just above the drill collars and connects to the drilling string. Instead of the drill collars wedging, the reamer being a larger outside diameter wedges itself into the keyseat. At this point, due to the design of the clutch on the upper section of the tool, the driller can lower the working string and rotate to the right. This operation causes the clutch of the upper section to ride up and around the corresponding clutch on the stuck sleeve until it reaches the cutaway portion where it drops approximately 2 in. Here the jarring action is created and the weight of the drill stem helps to jar down on the sleeve. Thus, by rotating with weight down, the sleeve is jarred down and out of the keyseat. The driller can then raise the working string 18 in. because the mandrel of the tool is free to move back and forth through the sleeve until he engages the lower mandrel clutch with the lower sleeve clutch at which time he can rotate to the right and cause the hard-faced reaming blades to cut into the side of the keyseat. *Houston Oil Field Material Co., Inc.*

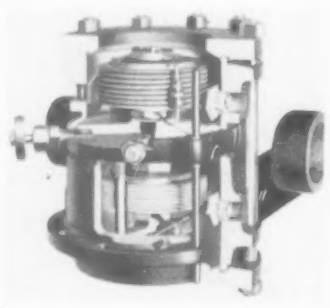
IT'S NEW CHECK IT

25 THE MACK THERMODYNE MODEL END-673. Specifically for installation in Mack vehicles, this new engine develops 170 b.hp. at 2,100 r.p.m. Torque output is 480 lb. ft., maximum, at 1,200 r.p.m. Most outstanding feature of the new engine is its combustion - chamber design, which is primarily responsible for its fuel economy. Formed entirely in the piston crown, the combustion chamber is semitoroidal in shape, with an essentially flat cylinder-head surface. The design of the intake port imparts a tangential direction of flow to the incoming air which results in a swirling movement in the combustion chamber. As the piston head rises, the semitoroidal shape of the piston crown accelerates the swirling air into the vortex traveling at such tremendous speeds that it literally tears the fuel spray to atoms as the fuel issues from the injection nozzle. Combustion is rapid and complete. The Thermodyne combustion chamber also assures more efficient injection nozzle cooling. The newly designed pistons eliminate hot spots by reducing heat concentration in the piston head, while the compactness of the combustion chamber, with its reduced heat-rejection surfaces, increases engine efficiency. To assure positive starting for different operational requirements, a choice of either electrical or air starting equipment is available with the electric system standard and the air system optional. *Mack Trucks, Inc.*



IT'S NEW CHECK IT

26 NEW MERCURYLESS DIFFERENTIAL PRESSURE INSTRUMENT is a new metal bellows-actuated differential pressure instrument, named the Dri-Flo orifice meter. The new units are offered for applications where accurate measurement is required without the use of a mercury manometer and are specially designed for ease of installation, accurate performance, and minimum maintenance. They are adaptable to all American pneumatic controllers, transmitters, differential valves, telemeters, and related instruments. Outstanding advantages are the one-piece stainless-steel bellows construction, direct, full-scale recording pen movement without external gearing or linkage multiplication, employment of nearly frictionless Teflon seal stuffing box, and stainless-steel or Monel metal operating parts. The internal working parts are especially accessible for inspection, calibration, or cleaning, by removing one or both case cover heads without disturbing manifold piping in any way. Distortion or bellows damage due to sudden overrange is prevented by stickproof check valves with flat synthetic seats. An additional bellows compensates for volume changes in bellows filling fluid resulting from ambient temperature variations. A Teflon sealed pulsation dampener for accurate control of response is externally adjustable under pressure. The instruments operate at working pressures to 1,000 psi. in differential ranges of 20, 50, 100, and 200 in., ambient temperatures of −25° to 175° F. *American Meter Co.*

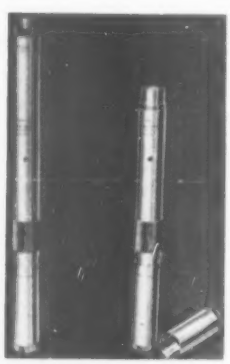


IT'S NEW CHECK IT

27 THE VI-SPEED DEHUMIDIFIER, a self-cleaning device that purifies compressed air and reduces humidity to a very low dew point, has several new developments of internal design. Improvements include self-adjusting nozzle coupled with nonclogging aspirator. This automatic control stabilizes unit operation during variable air pressures, and volumes for constant removal of injurious liquids, solids, and vaporous contaminants. The baffle surfaces have been enlarged and repositioned for greater exposure of contaminants to action of drying agent that captures vapors; larger area for separation of heavy impurities; and better accommodation of momentary overloads. Dryolite, self-cleaning drying agent, is compounded to cover a wider range of line temperatures from 100° F. to below freezing. Thus the Vi-Speed, always safe in flammable areas, is more adaptable for processing compressed air under conditions that vary from normal building temperatures to frigid readings, where air is used out of doors. *Van Products Co.*

IT'S NEW CHECK IT

28 GENCO TYPE-A, DEEP WELL SURVEY INSTRUMENT is a full mechanical, precise, and easy-to-operate instrument for determining the number of degrees and the direction that drill hole has drifted from the vertical. It is a punch-type well-survey instrument which records the drift and the direction of the well bore without any effect from temperature rise. It can be run separately in case the hole deviation or direction is desired. It is free from troubles, needs no flush valve, film, or battery. It is equipped with a contact timing watch. Within 2 minutes after the instrument reaches the bottom of the well, the plumb bob punch records drift and direction on the paper disk by means of the watch. *The Daiichi Trading Co., Ltd.*



IT'S NEW CHECK IT

PIPE LINES

Straits Crossed

First of two 20-in. lines pulled in less than a week

ST. IGNACE, Mich.—The first of two lines which will constitute the world's deepest pipe-line water crossing was successfully completed for Lakehead Pipe Line Co. at Mackinac Straits at 8:15 p.m. August 15.

The entire operation of pulling 20,000 ft. of 20-in. pipe through water as deep as 230 ft. took less than a week. The project was undertaken at 2:40 a.m. August 9.

A steam winch was installed for pulling operations on the south shore to supplant the diesel winch unit which had been hampered in an earlier attempt by the breaking of a drive shaft. This steam winch, with 105,000 lb. capacity, operated with a single drum which could handle 1,250 ft. per pull. Change-overs between pulls took an hour. Between the pulling of each of the eight 2,500-ft. sections of pipe for the crossing, the tie-in welding was done in 4 to 4½ hours. The fastest tie-in was made in 3½ hours. Moving of a 2,500-ft. section of pipe to the launching dollies took 45 to 50 minutes.

Pulling was done with a 1⅜-in. two-part cable operated with block and dead man. The greatest pull was 58 tons, while launching the seventh section. Only 27 tons was being pulled at the winch when the front end of the pipe reached the south shore.

Because of the effectiveness of the buoyant mandrels installed on the 2-in. main pulling cable, there was no trouble from the cable digging into the bottom. The line was unusually straight and deviated only a few feet from a direct route. Tension was held during pulling by a winch at the rear.

Early last week, the submerged line was filled with water and tested to 1,200 psi. Simultaneously pontoons were released and retrieved. In preparing for pulling the second line, 70 per cent of the dredging has been done. All welding has been completed for fabricating the 2,500-ft. sections of pipe. Coating and wrapping is now in progress.

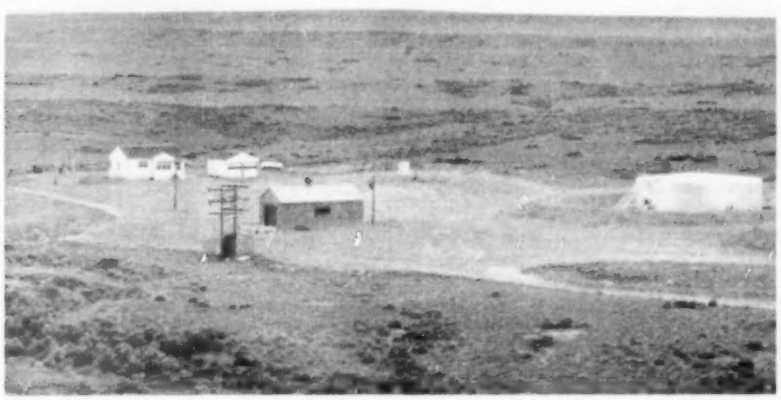
A date has not been set for the laying of the second line but it is expected to be in the first week of September.

The Mackinac Straits crossing is handled by the contractor, Merritt, Chapman & Scott Corp. It is part of the 644-mile, 30-in. Superior, Wis.-Sarnia, Ont. crude-oil line being built under the management of Bechtel Corp.

For earlier steps in the unusual project *(see The Oil and Gas Journal, August 3, page 34, and August 17, page 175).*

American Natural to Form Subsidiary to Lay New Line

DETROIT.—American Natural Gas Co. is seeking Securities and Exchange Commission permission to organize a



Lonesome Aid to Crude Transportation

This Ohio Oil Co. pipe-line station is not completely alone among these Wyoming hills. Across the ridge in the background is the Bonanza field with 33 oil wells producing 5,000 bbl. daily. The Big Horn basin crude comes over the ridge reaching the suction side of station at 150 psi.

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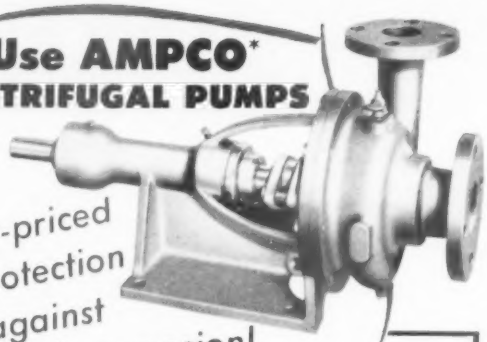

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new subsidiary which will construct and operate a 1,000-mile, 30-in. natural-gas line from Lowry, La., to a point near here.

American Natural plans for the new company, which will be called American-Louisiana Pipe Line Co., to transport about 300,000,000 cu. ft. of natural gas daily from the Louisiana Gulf Coast to the parent company's transmission system here for distribution to Michigan and Wisconsin markets.

The gas will be obtained from Stanolind Oil & Gas Co. and Superior Oil Co. However, Federal Power Commission authority for the $200,000,000 program has not been granted but will be sought in early fall. *(The Oil and Gas Journal, July 27, page 211).*

Construction on Magnolia's 154-Mile Crude Line Begins

DALLAS. — Construction on Magnolia Pipe Line Co.'s 154-mile, 16-in. crude line from Ringgold to Corsicana, Tex., has been started by the contractor, H. B. Zachry of San Antonio.

Presently, the right-of-way is being cleared with actual laying operations to begin when pipe deliveries are made. The new line, which is scheduled to be completed late this year, will replace a multiple 8-in. system now connecting the two Texas cities, and will have a capacity of 80,000 bbl. daily. The construction program also calls for the building of an electric main-line pump station at Ringgold *(The Oil and Gas Journal, July 13, page 167.)*

California Gas Line Started

BAKERSFIELD.—Southern California Gas Co. is constructing a 14-mile, 6-in. line connecting the Mountain View-Arvin-Lamont system with the company's main transmission system near here to increase natural-gas deliveries in the southern portion of the state.

The contractor, J. C. Lackey Construction Co., expects to complete the project by September 13.

Lone Star Laying Gas Line

DALLAS.—A 10-mile, 12-in. natural-gas line is being laid in the Palestine area of East Texas by Lone Star Gas Co.

The line will run eastward from the Navarro Crossing field in northwest Houston County to a junction with another line running west from Elkhart to the Elkhart gas field.

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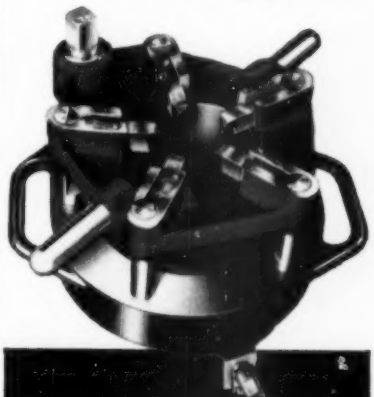

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NATURAL GAS

Seepage Halts Huge Illinois Underground-Storage Project

CHICAGO.—Marsh gas seepage has halted natural-gas injection into the huge Herscher, Ill., underground storage project being carried out by three Peoples Gas Light & Coke Co. subsidiaries, Natural Gas Storage Co. of Illinois, Natural Gas Pipeline Co. of America, and Texas Illinois Natural Gas Pipeline Co.

The escaping gas is coming from old water wells in the area. It was reported that the chemical composition of this gas is not the same as that being injected into the reservoir. Also, the seepage is coming from wells only 100 to 150 ft. in depth and the storage dome is 1,800 ft. underground. However, injection wells are being checked.

A Peoples Gas official pointed out that the present situation does not mean that the project won't work as expected. Original plans called for 20,000,000,000 cu. ft. of gas to be injected by the end of the year. When completed the underground storage reservoir will be the largest in the nation, costing ultimately $50,000,000 and having a maximum capacity of about 90,000,000,000 cu. ft. *(The Oil and Gas Journal, June 29, page 139.)*

I.N.G.A.A. Lists Speakers For Annual Convention

HOUSTON.—Six industry and government leaders will address the annual meeting of the Independent Natural Gas Association of America at the Shamrock Hotel here September 28 and 29.

The first day will be devoted to committee meetings. On the second day the delegates will hear addresses by L. F. McCollom, president, Continental Oil Co.; James F. Oates, Jr., board chairman, Peoples Gas Light & Coke Co.; Lt. Gen. Ernest O. Thompson, Texas Railroad Commission; C. P. Rather, association president; Edward P. McCormick, president of the American Stock Exchange; and Jerome K. Kuykendall, chairman of the Federal Power Commission.

Gas Sales Drop in June

NEW YORK. — Natural-gas sales during June totaled 3,561 million therms, a drop of 456 million therms from the previous month but a 13.7 per cent increase over June 1952 sales of 3,131 million therms, according to the American Gas Association.

For the 12-month period ending June 30, natural-gas sales amounted to 51,522 million therms, a 10.5 per cent gain over sales during the preceding year which totaled 46,656 million therms. The June index of sales was 173.9 per cent of the 1947-1949 average.

Natural Gasoline

Fluor Gets Elk City Plant's Second Expansion Contract

TULSA.—Contract for the second expansion project at the Elk City, Okla., natural-gas processing plant has been awarded Fluor Corp., Ltd., by Shell Oil Co. for 14 companies composing the unit there.

The new extension will increase the plant's intake capacity from 150,000,000 cu. ft. to 225,000,000 cu. ft. of gas daily and will raise the gas-injection capacity from 135,000,000 cu. ft. to about 210,000,000 cu. ft. per day. It is anticipated that the plant's production of natural gasoline, butane, and propane will be increased approximately 50 per cent.

The new project calls for installation of six 1,760-hp. compressors, a 62-ft. absorption column, and a 100-ft. fractionating column for stabilizing gasoline, along with separators, surge tanks, and a propane dryer.

Presently, work is in progress on a 15,000-bbl. propane underground storage reservoir, the first of its type at the plant. The reservoir will be in a salt layer at about 1,400 ft.

The entire program is expected to be completed in the spring of 1954.

N.G.A.A. to Hold Seminar On Hydrocarbon Analysis

FORT WORTH.—A 2-day seminar on the practical aspects of hydrocarbon analysis will be conducted by the Natural Gasoline Association of America at the Texas Hotel here September 21-22.

The seminar will consist of a series of lectures, quiz panels, question periods, and demonstrations. Discussions will be held the first day by A. J. Miller, Phillips Petroleum Co., on comparative analysis, and S. T. Preston, N.G.A.A. fractional-analysis instructor, will cover all phases of low-temperature fractional analysis of both gases and liquids. Also, S. L. Cahn, Beckman Instrument Corp. Pasadena, Calif., will discuss analysis by infrared spectroscopy, and A. P. Gifford, Consolidated Engineering Corp., Pasadena, will speak on "Hydrocarbon Analysis by Mass Spectrometer."

Survey Shows L.P.G. Growing More Popular as Engine Fuel

WASHINGTON.—Use of L.P.G. in internal-combustion engines is one of the fastest growing markets in this segment of the petroleum industry, according to data compiled by the Petroleum and Natural Gas Branch of the Bureau of Mines.

Total sales of L.P.G. for use as fuel for internal-combustion engines in 1952 amounted to 370,558,000 gal. for an increase of 80,567,000 gal., or 27.8 per cent over 1951. Sales under this classification in 1952 amounted to 4.75 times the volume moved for this purpose in 1949.

Sales for internal combustion represented only 8.3 per cent of total L.P.G. marketed in 1952, but the increase over 1951 represented 32.2 per cent of the total gain in sales of L.P.G.

Sales for industrial use increased 24.0 per cent in 1952 to reach a total of 324,967,000 gal. for the year. Domestic uses took 2,266,178,000 gal. of L.P.G. last year, but the gain over 1951 was only 99,365,000 gal. or 4.6 per cent. Domestic uses in District 3 were 3.6 per cent less in 1952 than in 1951.

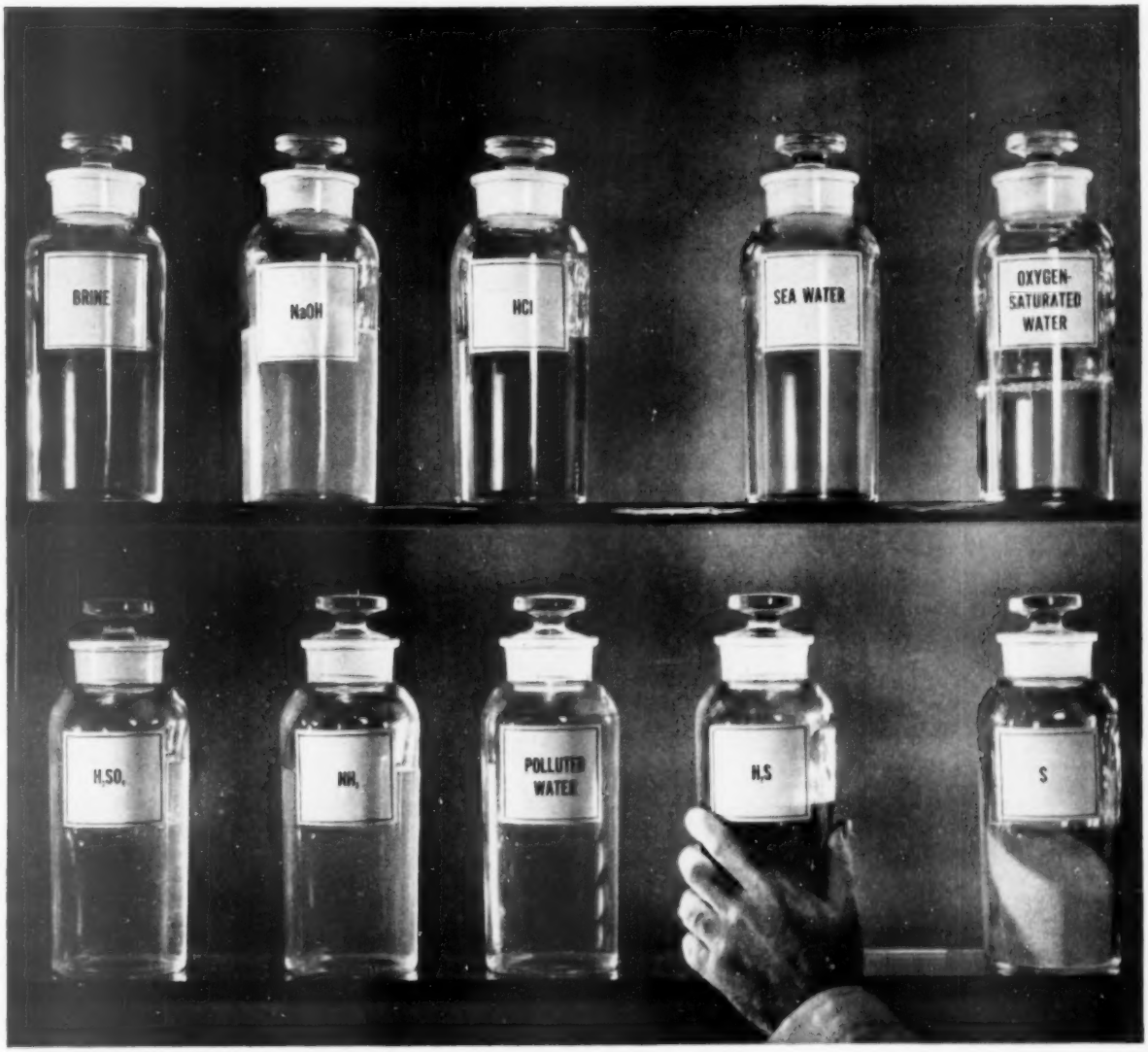
The accompanying tables show sales by principal uses and by principal consuming states.

SALES BY PRINCIPAL USES
(Thousands of gallons)

	1952	Per cent increase over 1951
Domestic	2,266,178	4.6
Gas manufacturing	259,697	—7.8
Industrial	324,967	24.0
Synthetic rubber	370,997	—1.0
Chemical plants	870,990	3.1
Internal combustion	370,558	27.8
All other	13,992	91.5
Sales in U. S.	4,477,379	5.9
Export	99,296	13.8

USE OF L.P.G. BY STATES
(Thousands of gallons)

	1952	1951
Texas	1,215,220	1,212,600
California	330,013	298,642
Louisiana	307,237	321,245
West Virginia	194,540	153,118
Illinois	148,592	155,310
Oklahoma	137,937	132,729
Kansas	114,530	99,694
Indiana	108,384	112,532
All others	1,920,926	1,744,405
Total	4,477,379	4,227,275



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REFINING

Carter to Seek Construction Bids Soon on Fluid Coker

TULSA.—Carter Oil Co. expects to ask for bids within the next 60 days on construction of the world's first commercial fluid coking unit.

The unit, now in the design stage, will have a charge capacity of 3,000 bbl. daily and will be erected at Carter's Billings, Mont., refinery.

The unit will employ a new coking principle just announced by Standard Oil Development Co. *(The Oil and Gas Journal, August 17, page 74.)*

The new process uses the fluidized solids technique originally developed for cat cracking, adapting it to the thermal cracking of heavy residual fuels which cannot be cat cracked economically.

Standard Adding New Units At California Refinery

LOS ANGELES.—Standard Oil Co. of California has finished construction of one new plant at its El Segundo refinery near here and has started construction on two new jobs.

The recent addition was a paraxylene plant. Although a similar plant has been operated at the company's Richmond refinery for years, this is the first xylene plant for El Segundo. It was constructed by Fluor Corp., Ltd.

Building of a 52,000-bbl. daily residium stripper and a 40,000-bbl. catalytic cracking unit—the largest of its kind in the world—has been started. The stripper is being built by M. W. Kellogg Co. and the cracking unit by Fluor. Both projects are scheduled for completion about a year from now.

Sinclair Gets Certificate for Marcus Hook Project

WASHINGTON.—Sinclair Refining Co. has been granted a certificate permitting rapid amortization for a portion of the $14,225,000 expansion project at the Marcus Hook, Pa. refinery, by the Office of Defense Mobilization.

The new construction includes a 16,000-bbl. per day catalytic reforming unit, alkylation facilities, and new units designed to produce petrochemicals. The certificate allows accelerated amortization on the following basis: $230,000 at 100 per cent, $10,075,000 at 65 per cent and $3,920,000 at 50 per cent. The reformer, principal unit in the new project, will operate with a platinum catalyst developed by Sinclair and Baker & Co., Inc.

A.P.I. Puts Out New Book On Refining Terminology

NEW YORK.—The American Petroleum Institute's new "Glossary of Terms Used in Petroleum Refining" is now off the press and available to the industry.

In addition to definitions and usage, the 188-page book contains a preface, a pronunciation key, and an appendix which secretaries will find most useful, since it contains the Gregg and Pitman symbols for all the terms covered in the book.

The completed glossary is one of several projects which the A.P.I. Division of Refining has undertaken during the past several years. It was assembled by a special subcommittee of the Committee on Petroleum Products headed by Albert E. Miller, Sinclair Refining Co., New York. The subgroup included: Eugene E. Ayres, Gulf Research & Development Co., Pittsburgh, chairman; M. P. Doss, The Texas Co., New York; H. W. Field, Atlantic Refining Co., Philadelphia; J. G. Raymond, Sinclair, New York; Stewart S. Kurtz, Jr., Sun Oil Co., Philadelphia; and Sidney E. Winn, Gulf Research, Pittsburgh.

Refining Briefs

LIMA, Ohio.—Construction has begun on a 12,000-bbl. per day Platforming unit by Standard Oil Co. (Ohio) at its refinery here. The new $7½ million unit will be on stream by summer of 1954, and will produce base stock for aviation gasoline production at the company's Toledo refinery. The Platformer is the fifth major unit to be added at Lima during the past 5 years, in a modernization program which is costing about $45,000,000.

BAKERSFIELD, Calif.—Construction of the new catalytic reforming unit to be erected by Douglas Oil Co. at its refinery here is to start in early October and is scheduled for completion early next year. The unit, of the type licensed by Atlantic Refining Co., will have a daily capacity of 2,500 bbl. It is to be erected by Ralph M. Parsons

EL SEGUNDO, CALIFORNIA – This plant for the preparation of feed stock for facilities used in the production of benzene and blending stocks for aviation and quality motor gasoline was designed, engineered and constructed by Fluor for Standard Oil Company of California at their El Segundo refinery. It was completed on schedule and within the budget money appropriated. Fluor has recently been awarded another contract by Standard for the engineering and construction of a 40,000 B/D (Model IV) Fluid Catalytic Cracking Unit – the largest of its kind in the world – including fractionating, gas recovery, caustic treating, hydrogen sulfide removal, additions to the alkylation unit, alterations to the naphtha re-run stills, and offsite engineering – all part of the $20 million expansion program now in progress. Whatever your plans include – a completely integrated plant or the expansion of existing facilities – Fluor's knowledge and experience to design and build for the refining and processing industries, are at your disposal.

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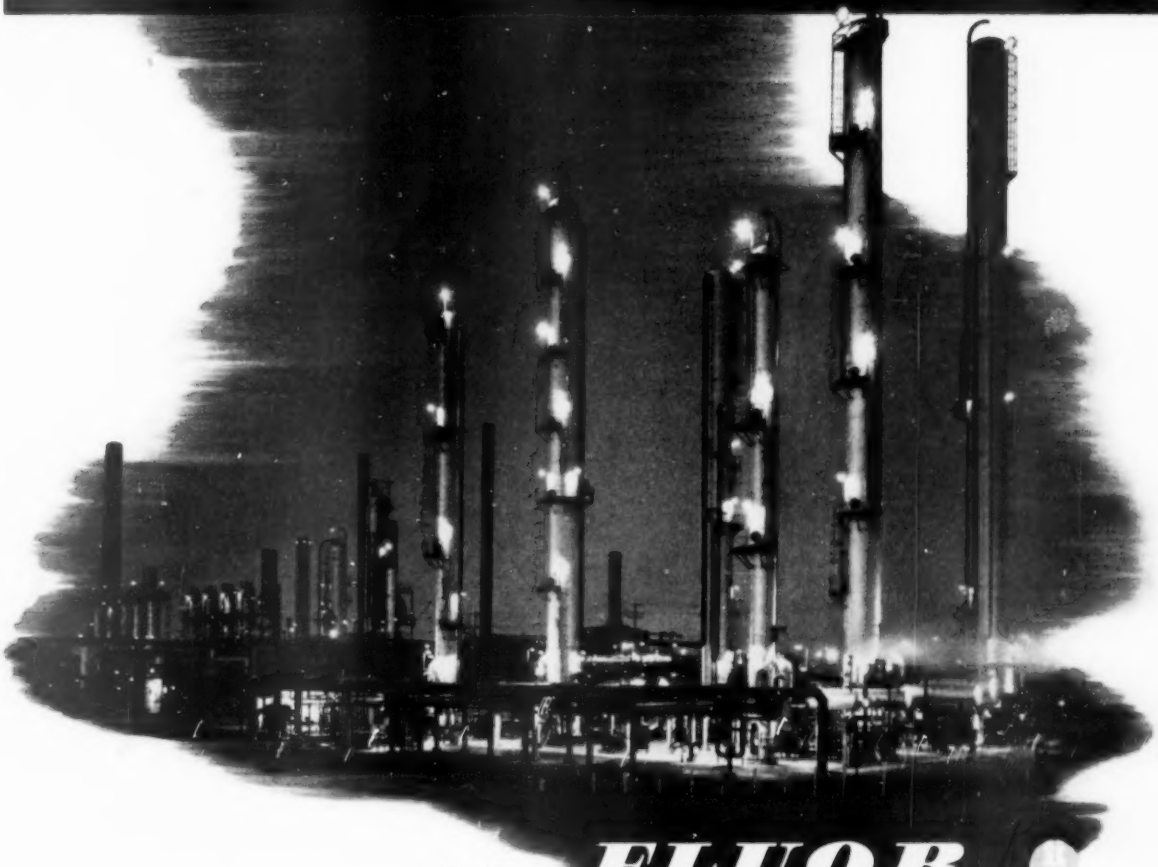

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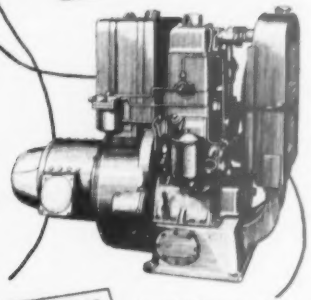

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Co., Los Angeles. Currently the refinery has a daily crude capacity of 7,800 bbl. and a cracking capacity of 5,000 bbl.

Petrochemicals

Petrochem Plant to Get Fuel Gas on Interruptible Basis

WASHINGTON.—Fuel gas will be on an interruptible basis to three National Petro-Chemicals Corp. plants at Tuscola, Ill., by Panhandle Eastern Pipe Line Co., according to a recent Federal Power Commission decision.

Between September 15 and April 15 about 7,000,000 cu. ft. of gas per day will be delivered to Petro-Chemicals' extraction and chemical plants. During the remaining 5 months, deliveries up to 24,000,000 cu. ft. daily will be allowed.

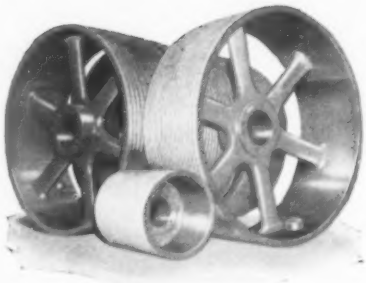
Recently hydrocarbon extraction and fractionation units at the vast $44,000,000 center were placed on stream. The hydrocarbon extraction unit will process 400,000,000 cu. ft. of gas daily, and the fractionation unit will separate the liquid hydrocarbons into 450,000 gal. per day of butane, propane, isobutane, and natural gasoline. Construction is now under way on four chemical plants, water-treating and power plants, and necessary storage and loading facilities. The chemical plants will produce ethylene, alcohol, ethyl chloride, and sulfuric acid upon completion in early 1955 *(The Oil and Gas Journal, July 13, page 80)*.

Panhandle Eastern owns 40 per cent interest in the project and will supply all the natural gas. The other 60 per cent is owned by National Distillers Products Corp.

Humble Gets 68,493 Lb. Daily Of Paraxylene from New Unit

BAYTOWN, Tex.—Humble Oil & Refining Co. has placed a new unit on stream here which will produce about 68,493 lb. daily of high-purity paraxylene, a raw material for the synthetic fiber dacron.

Company officials report the unit, which is located at Humble's 292,000-bbl. refinery here, uses a process which freezes paraxylene out of a mixed stream of xylenes. The usual heat method of extraction presented a problem since there is only 1° F. difference between paraxylene and metaxylene. Therefore, company researchers developed the low-temperature method to separate the product from related compounds.



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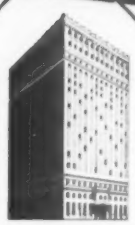

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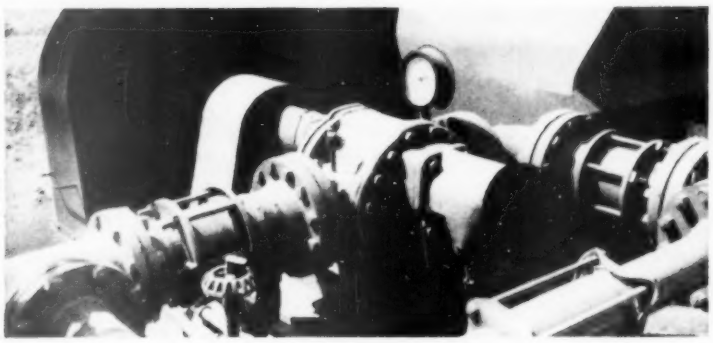
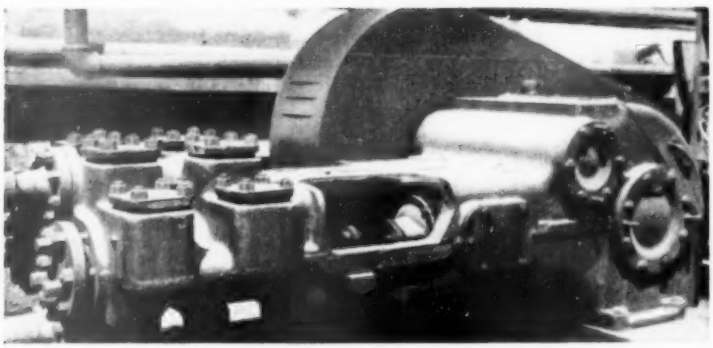
WORTHINGTON STEAM PUMP at a West Coast petroleum company delivers 10° API crude oil from a lease tank to several treating tanks. Available steam drives this heavy-duty pump with minimum power costs. A single boiler is used for heating the oil before it is pumped, as well as supplying steam to drive the pump.



WORTHINGTON ROTARY PUMP handles approximately 300 GPM of 32° API crude oil at the Tidewater Associated Oil Company in Ventura, California. At pressures ranging from 250 to 325 psi, the crude oil is pumped from a dehydration plant to a central group of tanks. Throughout the country, Worthington rotary pumps have proven themselves in refinery service, handling anything from asphalt to gasoline.



WORTHINGTON POWER PUMPS at the Continental Consolidated Corp., in Long Beach, California, move 14-16° API crude oil from a lease tank through a pipeline to nearby refineries. The pumps have been in service for eight years, handling crude oil against pressures ranging from 200 to 600 psi. This heavy-duty pump is ideal for all large capacity, high-pressure service.

Three different types of Worthington pumps were installed for the same kind of service at these oil companies. Why? Because the combination of pressure requirements and the type of power available differed in each case. Worthington, the oldest and largest pump manufacturer in the world, can give you *exactly* the pump for your needs. Get in touch with your nearest Worthington district office for more details. Or write directly to Worthington Corporation, Reciprocating Pump Division, Harrison, New Jersey.

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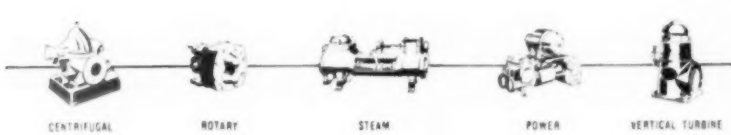

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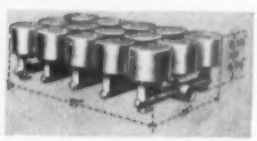

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Among the Drilling Contractors

Jet Drilling Co. Moves Headquarters to Denver

Jet Drilling Co. has announced the removal of its operating headquarters from Wichita, Kans., to Denver. H. E. Zoller, president, will continue to reside in Wichita.

The company, organized in January 1952, has been an active drilling contractor and operator in the Denver-Julesburg basin of northeastern Colorado and western Nebraska since its inception. Associated with Zoller in the company are Glenn W. Peel, vice president, and Irving Hardman, secretary. Ray Raines is drilling superintendent.

Thomas P. Pike Drilling Co., Los Angeles, has contracted with General Exploration Co. for a wildcat test to be drilled at East Los Angeles. Location is within the city limits at 1 CCMO, near the downtown section, at the intersection of Sheila Street and O'Neill Avenue.

Atlantic Drilling Co. is putting down the first of two tests it has contracted to drill for Aeco Corp. in a new development program the latter company is starting in the Wilmington area of the Los Angeles Basin, California. Locations for both tests are in the city limits. The first test, now drilling, is 2 Sandison.

Century to Operate New Shot-Hole Drilling Firm

Century Geophysical Co., Tulsa, has announced the formation of a new shot-hole drilling company under the name of Century Drilling Corp. The new company supplants the former Rayburn Drilling Co., a shot-hole drilling Co. recently acquired by the geophysical company. It operates shot-hole drills in New Mexico, Wyoming, North Dakota, Montana, and Texas.

Officers include Opie Dimmick, president; Ben F. Rummerfield, executive vice president; David R. Weichert, vice president; and James B. Bender, secretary-treasurer. Floyd H. Rayburn, president of the former Rayburn Drilling Co., continues with the new organization as supervisor of drilling operations.

Texita Oil Co., San Antonio, has contracted with Barrey & Moore, San Antonio independent operators, for a 4,500-ft. Vicksburg test to be drilled as 1 Jones at a wildcat location 3 miles northeast of the Mount Lucas field, in Live Oak County, lower Texas Gulf

Harry L. Edwards Drilling Co., Houston, has been operating continuously in the South Gillock field, Galveston County, Texas Gulf Coast, since 1946, and in this time has drilled the majority of Pan American Production Co.'s more than 90 wells in that field. Photographed on one of its deep-drilling rigs in the field are, back row, left to right: J. M. McPherson, tool pusher; Walter O'Brien, drilling-crew member; O. D. Blankenship, drilling superintendent; V. E. Miller and B. C. Hicks, crew members; Jerry Orr, vice president; and, front row, same order: C. D. Shork, J. B. Hudson, and J. M. McCall, crew members. (Photo by courtesy of Mission Manufacturing Co., Houston.)

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Globe Rock Bits consistently set the pace for high performance and we take pride in our current line of "Integral Jet" Rock Bits for present field conditions and formations. They are the very best, from every practical view point, that can be manufactured to accomplish maximum results at minimum cost and effort.

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Coast. It also has contracted with Alaska Steamship Co. for a 2,000-ft. wildcat test to be drilled 7 miles north of Campbellton, in Atascosa County, Southwest Texas. The latter location, 1 Youngblood, is about 2 miles southwest of the Muil field.

Rolo Oil Co., Shreveport, is the contractor on a wildcat test which Marvin Green and T. J. Brodie of Stephens, Ark., are starting at 1 Green, in 27-15s-20w, 1¾ miles northwest of Milner, Columbia County, Arkansas. Location is a mile west of the Stephens field.

Kerr-McGee Oil Industries, Inc., Oklahoma City, is drilling 10,000-ft. exploratory test for Blackwood & Nichols Co., also of Oklahoma City, 5 miles west of Purcell, in McClain County, Central Oklahoma. Location is at 1 Grisham, in 18-6n-2w.

Texita Oil Co. has a rig under contract to Charles G. Dunwoody of Houston for a 6,000-ft. wildcat test located at 1 Davis, in the BS&F Survey 9, 7 miles southwest of Charlotte, in Atascosa County, Southwest Texas. Location is 4 miles south of the Charlotte field.

Circle Drilling Co., Lake Charles, is preparing to drill another test, the second, for Ada Oil Co. of Houston in the Crowley area of Acadia Parish, coastal Louisiana. It will be at 1 Baronet, in 9-10s-1e. The company's first test, 1 Thompson, was drilled to 9,500 ft., and now is in process of completion as a producer in the Onezime formation.

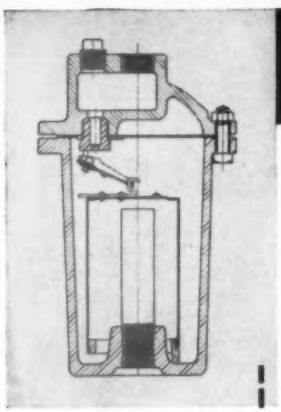
Newman Brothers Drilling Co., San Antonio, has contracted with George S. Hammonds, Dallas independent operator, for a 7,600-ft. test located at 1 Leubert, in the C. W. Slade Survey 19, 1½ miles southwest of Lindenau, in De Witt County, Texas Gulf Coast.

ACTIVE ROTARY RIGS*

Area—	Week ended 8-17-53	Change week ended 8-10-53	Change week ended 8-18-52
Gulf Coast	576	+ 6	+ 64
N. & W. Tex.-N.M.	790	— 6	+ 58
Ark.-N. La.-E. Tex.	146	— 4	+ 24
Oklahoma	369	+ 3	+ 75
Kans.-S. Neb.	156	— 3	+ 12
Illinois-Eastern	153	+ 1	+ 20
Rocky Mountains	271	— 2	+ 46
Pacific Coast	159	—11	+ 2
Total U. S.	2,620	—16	+301
Western Canada	178	— 2	+ 19
Total	2,798	—18	+320

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States, North and West Texas-New Mexico, and Oklahoma-Kansas are shown on pages 205 and 206.

LIQUID LEVEL CONTROL OF CORROSIVE LIQUIDS?



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ARMSTRONG traps extensively have been used to drain corrosive liquids from receivers and maintain the liquid level at any desired point. Bodies and caps have been furnished of nickel, aluminum-bronze, monel, stainless steel and other metals which can be cast or forged. Working parts, also, have been of nickel, monel, stainless steel or any weldable material available in sheet, rod and bar form.

Traps made of low carbon chrome iron, for example are being used to drain 60% Nitric acid from receivers at 75-100 psig. Perhaps you have a corrosive liquid control problem that can be solved with Armstrong traps. For complete data write:

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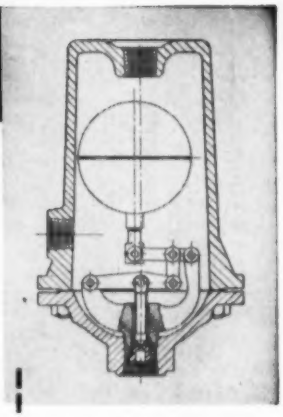

BALL FLOAT TRAPS with compound or direct lever mechanism for draining water or light liquids from gases or other liquids. Also widely used for air or gas relief service.

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LEADING THE FIELD OF SEISMIC EXPLORATION

EXPLORATION

Small Basins Merit Further Study

by Philip C. Ingalls

TWO small, generally ignored sedimentary units, the North Park area of North-Central Colorado and the Laramie basin of southeastern Wyoming, have witnessed revivals of interest during the past year.

Trigood Oil Co.'s testing Sundance discovery at a fault trap a few miles to the northeast of the big Medicine Bow anticline, has renewed interest in the potentialities of the northern end of the Laramie basin.

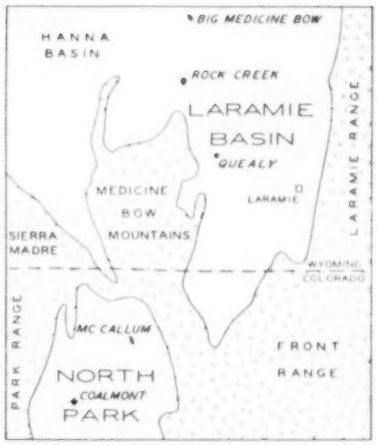
Excitement in the North Park area flared last October when M. E. Davis 1 State, on the Coalmont anticline, flowed oil, gas, and mud at an estimated rate of 35 bbl. per hour from the Cretaceous-Frontier. This first test of the surface-expressed feature was not completed as an oil well because of difficulties with lost circulation. A 40-acre north offset, drilled by Hiawatha Oil & Gas Co., was completed dry after finding the Frontier less fractured and with a tighter facies than at the initial test.

It was these two small intermontane basins that were the locale of the Wyoming Geological Association's eighth annual field conference.* Though neither basin is currently looked upon as offering great potentialities, both are considered to merit additional exploratory work.

Laramie basin . . . The oil fields of the Laramie basin are few in number and for the most part small in areal extent and recovery. Only Rock Creek from which some 30 million barrels of oil have been taken, has produced oil in substantial quantities. Quealy and Big Medicine Bow fields have produced about 5 million barrels each, but all the others are few-well, small-production fields.

Production has been found in the Muddy, Cloverly (Dakota-Lakota), the Sundance, and the Pennsylvanian-Casper (Tensleep). Only at Quealy have all five of the formations been found productive.

Exploratory drilling in the Laramie basin has been rather completely restricted to the margins of the unit. The basin is filled with Tertiary gravels which mask the older rocks and make seismic work extremely difficult. Intense exploration away from the margins of the basin has not been encouraged by the results of drilling at the margins. Big Medicine Bow field is on a structure 7 miles long, 3 miles wide, with a closure of 2,900 ft. and yet this structure has yielded only 12 producing wells out of 16 drilled within the upper 400 ft. of structure and, today, has only 6 wells (4 Sundance and 2 Tensleep) producing oil or gas. Such big structures with small oil fields give credence to the "argument" that the basin is poorly saturated. However, Trigood's fault-trap discovery may lead to a different attitude toward the Medicine Bow structure and other big structures known in the basin.



Two almost neglected oil-producing basins.

North Park basin . . . Like the Laramie basin, North Park has not been extensively prospected for oil. There has been but one commercial oil field developed in the basin. This field, North McCallum, produces carbon dioxide gas and condensate from four Dakota-Lakota wells with four Dakota-Lakota wells and one Morrison well shut in. Reinjection of the carbon dioxide gas, which has no assured market in solid form, has not been found economic and currently is being flared. North McCallum is on a structure 17 miles long which has known closures of 1,500 and 2,000 ft. Two carbon dioxide wells with low condensate yield have been completed toward the southern end of the structure.

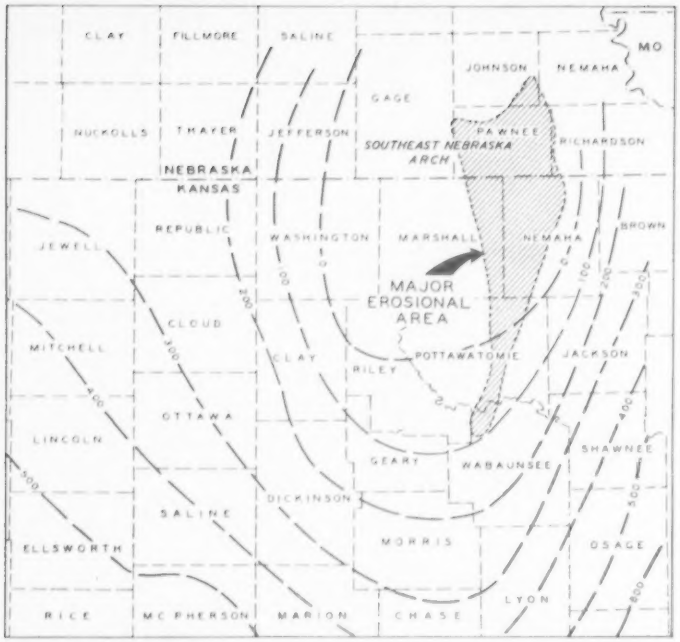
There can be little doubt that the inadequately tested Laramie and North Park basins contain untapped accumulations of oil. However, indications are that these accumulations are small and cannot be expected to be intensely sought until the more promising basins have been given a thorough going over.

*University of Wyoming geologists and others who directed the conference (see photograph on page 96), packed a diversity of fascinating geology into three 1-day trips out of Laramie.

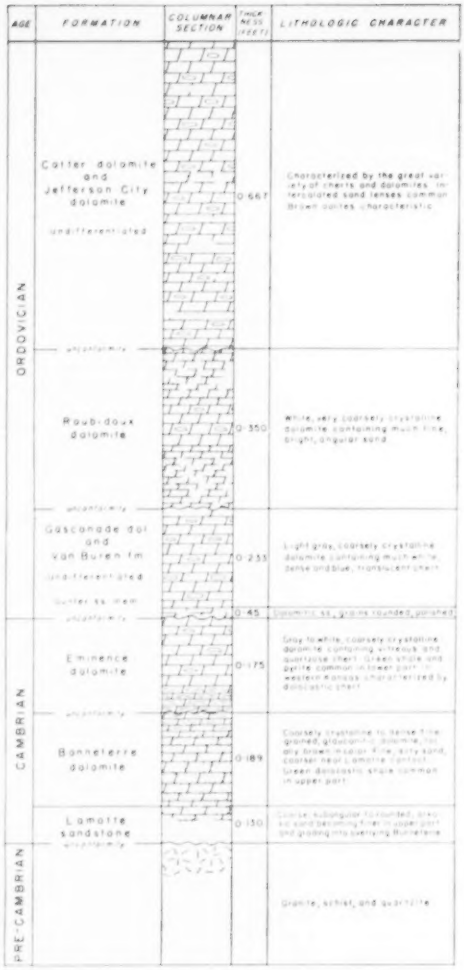
HIGHLIGHTS OF WEEK'S DEVELOPMENTS

MONTANA . . . The Chicago Corp. and Republic Natural Gas Co. have a Morrison discovery at 1 NPRR, SW SE NE 17-11n-31e, Musselshell County. The well flowed oil at the estimated rate of 2 bbl. per hour on drill-stem test at 2,796-2,806 ft. The only other Morrison production in Central Montana is in old wells at Cat Creek pool. Sun Oil Co.-Phillips Petroleum Co. 1 Dynneson, C SW NE 32-24n-58e, Richland County, has been completed with initial production of 745 bbl. of oil per day through 20/64-in. choke.

OKLAHOMA . . . Pure Oil Co. 1 C. E. Hobaugh, Cleveland County discovery in SE SW SW 30-8n-1w, flowed 367 bbl. of oil in 5 hours, or 73 bbl. per hour, on ½-in. choke as production tests in the Tulip Creek sand indicate good success. S. C. Yingling is preparing to complete 1 Swarts, NW NE NE 32-20n-2e, Payne County Wilcox sand discovery. The well flowed oil at rates estimated up to 100 bbl. per hour on drill-stem test.



SOUTHEAST NEBRASKA ARCH is defined by this isopach map depicting interval of Cambro-Ordovician dolomites found below St. Peter sandstone; major erosional area is crosshachured to show where Nemaha anticline uplift has caused removal of St. Peter rocks. (Courtesy Kansas Geological Survey) (Fig. 1).


AGE
FORMATION
COLUMNAR SECTION
THICKNESS (FEET)
LITHOLOGIC CHARACTER
ORDOVICIAN
Cotter dolomite and Jefferson City dolomite
undifferentiated
0-667
Characterized by the great variety of cherts and dolomites interbedded sand lenses common brown oolites characteristic
Roubidoux dolomite
0-350
White, very coarsely crystalline dolomite containing much fine, bright, angular sand
Gasconade dol and Van Buren fm
undifferentiated
0-233
Light gray, coarsely crystalline dolomite containing much white, dense and blue, translucent chert
0-45
CAMBRIAN
Eminence dolomite
0-175
Gray to white, coarsely crystalline dolomite containing siliceous and quartzose chert. Green shale and pyrite common in lower part. In western Kansas characterized by dolocastic chert
Bonneterre dolomite
0-189
Coarsely crystalline to dense fine-grained, glauconitic dolomite, locally brown in color. Fine, silty sand, coarser near Lamotte contact. Green dolocastic shale common in upper part
Lamotte sandstone
0-130
PRE-CAMBRIAN
Granite, schist, and quartzite

TYPE COLUMNAR SECTION showing stratigraphy of Cambrian and Lower Ordovician formations in vicinity of Southeast Nebraska arch (Fig. 2).

Southeast Nebraska Arch May Offer Possibilities in Cambro-Ordovician Rocks

Four different periods of deformation have obscured early geologic features

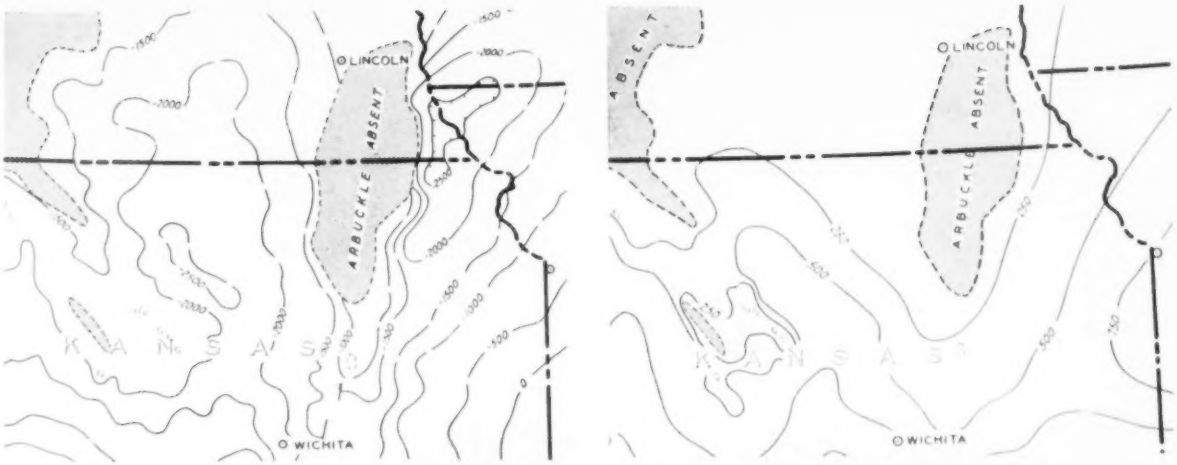
by Joseph A. Kornfeld

RENEWED interest in the Northern-Mid-Continent region points up potentialities of formations lying in Cambrian and Lower Ordovician rocks. For years, Kansas geologists have known of the occurrence of commercial oil and gas production from the Cambrian formations on the Central Kansas uplift and have reasoned that similar subsurface truncations of the Cambrian should produce elsewhere. One example cited here is the Southeast Nebraska arch which possesses necessary reservoir rocks, the source beds, and the magnitude of folding generally recognized as prerequisites for a petroliferous province.

Origin . . . A south trending positive area, termed the Southeast Nebraska arch, was formed in Ordovician time as shown in Fig. 1. Tectonic movements involved a subsidence of a deep basin in Central Missouri in which more than 2,000 ft. of dolomites are preserved. On the crest of this arch, St. Peter formation rests on pre-Cambrian granites. Off the flanks, St. Peter formation rests on the beveled edges of late Cambrian and Early Ordovician rocks.

The contours shown in Fig. 1 represent the thickness of the Cambro-Ordovician rocks lying beneath the St. Peter sandstone which was deposited across this arch following regional baseleveling. The cross-hatched area indicates where Upper Cambrian and Lower Ordovician rocks (originally deposited in this area) were removed by pre-St. Peter erosion of the Southeast Nebraska arch. Pre-Pennsylvanian erosion of the Nemaha anticline removed the St. Peter rocks, and the beveled surface is overlain by Pennsylvanian rocks.

Objectives . . . Potential objectives are the Cambrian Bonneterre dolomite and the Ordovician Roubidoux dolomite. Bonneterre dolomite is coarsely crystalline to dense fine-grained, glauconitic dolomite, locally brown with fine silty sand, coarser near Lamotte contact; green dololocastic shale is common in the upper part. Roubidoux dolomite is white, very coarsely crystalline dolomite containing much fine, bright, angular sandstone. (Fig. 2.)



ARBUCKLE DOLOMITE MAPS for Northern Mid-Continent region is shown in these two regional maps prepared by John G. Bartram and others. Subsurface structure is shown at left using 500-ft. contours, while isopach contours with 250-ft. contours appear at right. (Courtesy A.A.P.G.) (Fig. 3).

Regional deformation . . . Lee, Leatherock, and Botinelly[1] in their excellent report on the Salina basin point out five different periods of deformation and stress that each change in the pattern of structural movement has altered the attitude or position of earlier formed anticlines as well as earlier regional structure. Thus the structural deformation that formed the Southeast Nebraska arch has been obscured by a series of geologic events as will be discussed below. Not only has the direction of dip shifted the crest of low anticlines but has destroyed closure in other examples. As a consequence, exposed crests of low anticlines in the younger rocks do not, in all cases, reveal accurately position and configuration of those anticlines in older, more steeply dipping rocks. Moreover, repeated changes in deformation pattern and repeated reelevation and beveling of the formations influenced migration and distribution of fluids in the rocks. Each structural movement has influenced accumulations of oil and gas.

Between the deposition of the St. Peter sandstone and Mississippian limestones, the area originally known as the Southeast Nebraska arch subsided and the North Kansas basin was formed. Salina basin, which did not come into existence until after Mississippian time, was formed on the southwestern flank of the North Kansas basin. Therefore all references to the Salina basin prior to the end of Mississippian time are **geographical** only. During this period, structural deformation was a complete reversal of that occurring prior to St. Peter time. Ozark uplift rose from the deepest part of the previously subsiding area in southern Missouri. The previous positive element—Southeast Nebraska arch—became the locale of the gradually subsiding North Kansas basin. Contemporaneously, the Chautauqua arch and Central Kansas uplift were developing on deposition of the Devonian rocks.

A third period of flooding took place during Mississippian time and diminished into Pennsylvanian and Permian time. Principal structural feature developed in Kansas was the Nemaha anticline (trending almost north and south), which was flanked by the Salina basin on the west and the Forest City basin on the east. Salina basin was a synclinal area trending northwest and paralleling the northern flank of the Central Kansas uplift. Salina basin was formed as a synclinal area trending northwest-southeast and paralleling the northern flank of the Central Kansas uplift. During this period many secondary anticlines were developed which paralleled the Nemaha anticline and the Salina basin syncline.

After Permian time and before Cretaceous deposition, a broad synclinal basin developed in southwestern Kansas and this gave the Pennsylvanian and Permian rocks of eastern Kansas a southwesterly dip.

Following deposition of Cretaceous strata, rocks were tilted toward the northeast in western Kansas and toward the north and northwest in Central Kansas. Moreover, these rocks were elevated 1,500 to 2,000 ft. above sea level in the Salina basin.

Common denominators . . . Bartram, Imbt and Shea[2] point out in their comprehensive paper on the occurrence of oil and gas in the Arbuckle and Ellenburger formations of the Mid-Continent region that certain general features appear to be common to **all** areas, both producing and barren. These features are:

1. The character of the Arbuckle-Ellenburger formation which consists predominantly of limestone, dolomitic limestone, dolomite with chert and siliceous oolites, and minor amounts of sandstone and shale.

2. An abundance of formational water wherever porosity and permeability occur.

3. The direct association of commercial accumulation of oil and gas with structural features which may have been formed alone, or by folding with later truncation and overlap.

These authors point out that "broad areas and prominent structures are still apparently dry in the Arbuckle-Ellenburger, but it is unwise and unsafe to assume that they will never produce oil from this formation. (Fig. 3.)

Their observations are that greater possibilities for production exist in the lower part of the Arbuckle-Ellenburger than are generally admitted. They call attention to the condition that too many dry holes are abandoned on prominent structures when water is encountered in the first porosity in the Arbuckle-Ellenburger.

Current exploration . . . One of the few exploratory wells now drilling in this area is located 6 miles northeast of Holdredge in Phelps County, Nebraska. It is Pure Oil Co. 1 Kline, NW NW SW 13-6n-18w, which is drilling below 3,300 ft.

References

1. Lee, Wallace, Constance Leatherock, and Theodore Botinelly, "The Stratigraphy and Structural Development of the Salina Basin of Kansas," Bull. 74, Kansas Geol. Surv., November 1948, pp. 1-155.

2. Bartram, John G., W. C. Imbt, and E. F. Shea," Oil and Gas in Arbuckle and Ellenburger Formations, Mid-Continent Region," Bull. A.A.P.G., Vol. 34, No. 4 (April 1950), pp. 682-700, 9 figs.

TEXAS

SOUTHWEST TEXAS

Third Pay Zone Opened For El Benadito Field

Another pay zone, the third, has been opened in the El Benadito field of Starr County with the completion by Kirby Petroleum Co. and W. H. Holland of their 1-C Brannan in a sand interval at 5,928-32 ft. The discovery already is being confirmed by Magnolia Petroleum Co. at its 4 Neblett, testing the same sand with casing perforated at 5,901-15 ft.

The Kirby-Holland well flowed 88.32 bbl. of 41.5°-gravity oil per day on potential gage through ⅛-in. choke, registering flowing pressure of 1,425 psi. on the tubing with a gas-oil ratio of 2,556 cu. ft. per barrel. Magnolia's well flowed on initial tests at the rate of 107 bbl. of net 39.7°-gravity oil per day through ⅛-in. choke with 490 psi. pressure on the tubing. The latter well was drilled to 9,000 ft. as an exploratory test.

Previous production in the field has been from Frio-Vicksburg sands at 5,400 ft. and 5,700 ft. Locations of the new deeper producers are on the south edge of the field.

New North Agua Dulce Pay

Puenticitas Oil Co. has added another pay zone in the North Agua Dulce field, 5 miles northeast of Banquete, western Nueces County, with the completion of its 1 Countiss. The new pay, open through casing perforations at 6,338½-40 ft., is designated as the Northwest Segment Dixon sand. On state potential test of the sand, the well flowed 127 bbl. of 41°-gravity oil daily through 7/64-in. choke. Gas-oil ratio was 958 cu. ft. per barrel.

TEXAS GULF COAST

Oil Production Opened in Old Stratton Ridge Area

First oil production for the south flank of the Stratton Ridge dome, in Brazoria County, has been opened by E. Cockrell, Jr., at his 1 Bowers, in the J. Groce Survey. The new discovery well, producing from a sand interval at 5,568-88 ft., flowed at the rate of 108 bbl. of 21.5°-gravity oil per day through 7/64-in. choke with 590 psi. pressure on the tubing. Total depth is 6,574 ft.

Stratton Ridge is one of the older known salt domes on the Texas Gulf Coast, having been discovered in 1922. Numerous tests have been drilled on and around its flanks with only a limited amount of production having been found. Existing production is approximately 2 miles across the dome on the north side.

Walker County Wildcat Makes Pumping Producer

A new oil pool, located 16 miles northwest of Huntsville, in northern Walker County, one of the inland counties in the upper Texas Gulf Coast region, has been opened by Chambers Drilling Co. and associates. The discovery well, 1 Gibbs Brothers, completed on the pump, produced 74 bbl. of 42.6°-gravity oil daily, cutting 10 per cent water. Production is from sand at 4,563-66 ft.

NORTH TEXAS

Wilberns Discovery Is Flush Producer

The second known well to complete from the Wilberns dolomite of the Cambrian formation did so with a record potential. American Trading & Production Corp. 2 Little, on the west side of White Flat field, Nolan County, rated a daily potential of 1,869.62 bbl. of 46° oil.

That figure was based on actual flow of 540.9 bbl. of oil in 7 hours and 40 minutes through 32/64-in. choke from perforations between 5,506-30 ft. Completion was natural and flowing tubing pressure was 600 psi.

The Wilberns section will be produced through the tubing and dual completion made from the Strawn sand around 5,100-50 ft. The new pay section is the seventh productive horizon for the field. Others are Hickory sand, Ellenburger, Strawn, Caddo and Odom limestone.

Grayson County . . . Superior Oil Co. 2-A Anderson, second well for the newly discovered field just north of Whitesboro, gave the field a new pay in the Oil Creek sand. Potential was 117 bbl. of low-gravity oil a day through 6/64-in. choke, from perforations between 5,712-19. Total depth was 5,793 ft. Location is southwest of Superior 1 Anderson which had Pennsylvanian sand pay at 4,938-47 ft.

Recompletion in new pay . . . Continental Oil Co. 27 Hildreth Unit, Willis Survey, A-733, added a new lower Bend conglomerate pay zone when it was deepened and recompleted.

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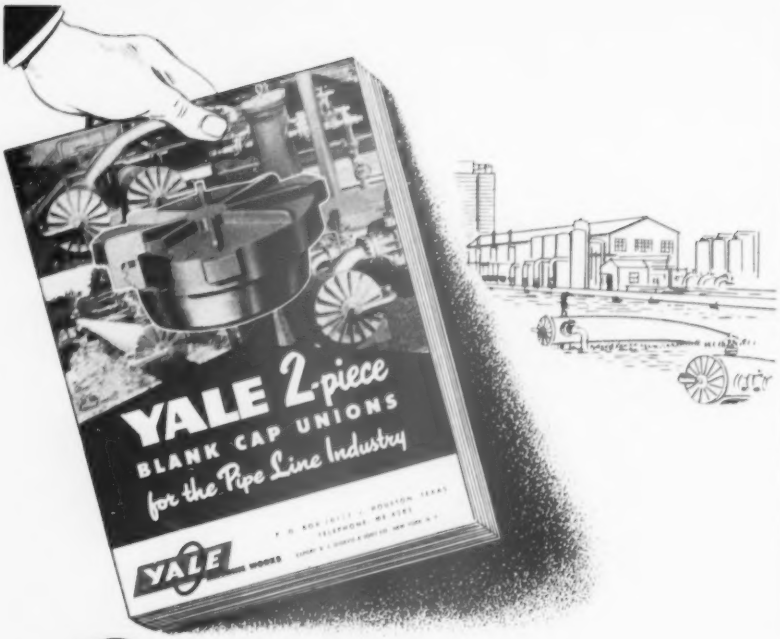

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New potential was 170.86 bbl. of oil in 11 hours through ½-in. choke from perforations at 6,304-11 ft. Original completion was by Sinclair Oil & Gas Co. as 5 Middleton, producing from 6,102-42 ft.

EAST TEXAS

Deep Wildcat Tests Shallow Oil Shows

W. D. McBee 1 H. G. Hatley, Camp County wildcat southeast of Newsome, drilled into the sub-Clarksville at 3,795 ft., elevation 417 ft., and developed oil on two drill-stem tests.

First test from 3,854-57 ft. returned 290 ft. of black, 16° oil and 50 ft. of oil and gas-cut mud. Bottom-hole flowing pressure was 400 psi. Second test from 3,856-63 ft. recovered 570 ft. of oil, and bottom-hole pressure was slightly less. It was drilling ahead in Georgetown limestone at 5,240 ft. at last report. Projected depth was 8,250 ft.

San Augustine County . . . Stanolind Oil & Gas Co. 1-A Fox, rank wildcat 12 miles northeast of Broaddus, was reported dry at 9,002 ft., total depth.

WEST TEXAS

Dawson Reef Discovery Drills 98 Ft. of Pay

Seaboard Oil Co. of Delaware 1 Herman Pettaway, 40-34-T&P, reported flowing oil on a series of drill-stem tests covering a total of 98 ft. of reef limestone, with no water. Operators were coring ahead at last report.

The new prospect is 15 miles southeast of Lamesa and about 3½ miles southwest of nearest production in Spraberry field.

Top of the reef was 7,885 ft., minus 4,949 ft., which checked 394 ft. high to Seaboard 1 Woodul, a dry hole 1⅛ miles northeast. On first drill-stem test from 7,884-7,910 ft. the well flowed 11.4 bbl. of oil in 1 hour through 1-in. choke. From 7,910-33 ft. it flowed 38.62 bbl. of 40°-gravity oil in the first hour through ⅜-in. choke, and operators reversed 34.5 bbl. of oil out of the pipe. Flowing pressure ranged from 1,625-3,075 psi. Last test was from 7,932-83 ft., which had oil in 17 minutes and tanked 45.2 bbl. of clean oil in 1 hour through ⅜-in. choke. Operators cored additional saturation at 8,008 ft.

No. 1 Pettaway had sample top on the Spraberry at 6,700 ft. and flowed oil between 6,695-6,850 ft.

Fusselman Prospect Flowing

The Texas Co. 1 Mabee, Eastern Andrews County wildcat, developed flowing oil in 2 hours and 25 minutes on its first test in the Fusselman section of the Silurian from 12,850-920 ft. It was cleaned into pits for 1 hour, making 20 bbl. of oil, cut 10 per cent with water and mud. Later a 3-hour gage tanked 66 bbl. of oil, with no report on water. Gravity was 44.6° and flowing pressure was 4,860 psi. Operators have filed application to drill ahead to 13,600 ft. to test the Ellenburger.

Mississippian oil show . . . Recovery of clean oil on a drill-stem test of the Mississippian has been reported at Blackwood & Nichols 1-7 Granberry, extreme western Gaines County. A 2-hour test from 10,946-11,010 ft. developed 7,560 ft. of oil, 540 ft. of oil and gas-cut drilling mud and 1,620 ft. of oil and gas-cut water blanket. There were no shows of

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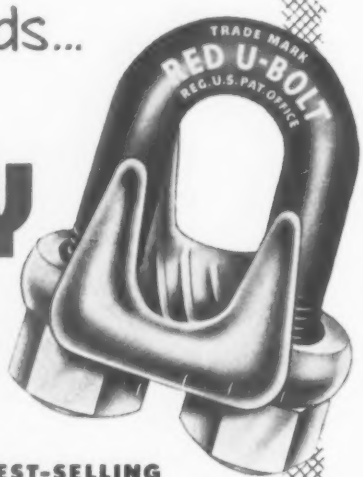

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formation water. Top of the Mississippian was 10,700 ft. on elevation of 3,620 ft. Drilling continued, on a Devonian contract.

Shell Oil Co. 1 Foster, deep wildcat northwest of West Seminole (San Andres) field, tested oil-cut mud on first drill-stem test of the Devonian at 11,365-11,402 ft., and recovered 465 ft. of oil, 186 ft. of mud-cut oil and 929 ft. of water on second test from 11,402-11,442 ft.

Headlee pool . . . Texas Gulf Producing Co. 4 Headlee in Section 8 became the field's first Devonian completion. The well kicked off after acid treatment through perforations from 11,756-11,842 ft. and flowed 54 bbl. of oil in 3 hours through 16/64-in. choke.

The Texas Co. 1 Texas-Gulf-McKnight, development well in Headlee pool, prepared to complete from the Ellenburger after a drill-stem test from 13,320-13,344 ft. flowed 115 bbl. of oil in 1½ hours through 1-in. opening.

ARKANSAS

Gas-Condensate Production Indicated at Miller Test

Good indications of gas-condensate production from the Young zone of the Rodessa are reported at McAlester Fuel Co.'s 1-A W. H. Thornton estate, C SE NW 30-18s-27w, Miller County.

Recovery in the tool was 180 ft. of water cushion cut with an estimated 30 per cent condensate, 180 ft. of slightly condensate-cut water cushion and 300 ft. of muddy, gas-cut water cushion. The test was made at 6,330-39 ft. for 30 minutes. The tool used ¼-in. chokes and loaded with 1,000 ft. of water cushion.

LOUISIANA

NORTH LOUISIANA

Ouachita Gas Strike Opens Carlton Field

W. C. Feazel et al has completed 1 F. N. Winninger, 11-18n-1e, Ouachita Parish, opening Carlton gas field. The well was finaled flowing 2,854 M.c.f. of gas per day plus 5 bbl. of condensate per million through 21/64-in. choke. The new strike is producing from perforations at 9,048-49 and 9,052-64 ft. in the Bodcaw sand.

SOUTH LOUISIANA

New Producer Confirms Church Point Discovery

Discovery in November 1952 of gas-distillate production on the Church Point prospect in northeastern Acadia Parish has been confirmed with the completion the past week of the second well.

The new producer, located ¾ mile southwest of the discovery well, was drilled by Pan American Production Co. as 1 Stafford. Its fluid production, 60.8°-gravity condensate, was gaged at 50 bbl. daily through 12/64-in. choke with 3,100 psi. pressure. Producing interval is 10,330-38 ft. in hole drilled to 11,455 ft.

The discovery well, 1 Harmon, drilled by Union Sulphur & Oil Corp., produces from an interval at 10,235-40 ft. Its initial fluid

production was 53 bbl. of 52.2° condensate per day through 12/64-in. choke.

Four Isle Deep Producer

Superior Oil Co. has completed a prolific gas-condensate producer on the Four Isle dome in the coastal marshes of Terrebonne Parish. The well, 1 I.L. & E.-State Unit 17, a deep flank test, flowed 341.15 bbl. of 57° gravity condensate on a 24-hour potential gage through 22/64-in. choke with tubing pressure at 4,025 psi. Pay interval is at 11,872-87 ft. in hole drilled to 12,029 ft.

OKLAHOMA

Operator to Check Second Wilcox at Payne Strike

Davon Oil & Gas Co. is coring for a look at the second Wilcox at their discovery well in the western part of Payne County with production already established on a drill-stem test in the first Wilcox sand.

The 1 Bode, NW SW NW 14-19n-1w, on drill-stem test at 4,957-76 ft. in the first Wilcox, flowed gas in 3 minutes and began flowing oil in 1 hour and 7 minutes at the estimated rate of 10 bbl. per hour. The drill pipe filled with oil at once on another test at 4,969-76 ft. The new pool is located 1¼ miles southwest of East Orlando pool.

Tests Continue at Another North Freeny Well

Good results of production tests are reported at another well in McClain County's new North Freeny pool. K. A. Ellison, C. B. Wrightsman and Edwin L. Cox 1 Harrison, C SE SW 14-8n-4w, flowed 246 bbl. of oil in 12 hours on 26/64-in. choke during the latest test. On other tests the well flowed 252 bbl. of oil in 12 hours on 26/64-in. choke and 462 bbl. of oil in 18 hours on 26/64-in. choke. The well's pay is Tulip Creek perforations at 10,562-76 ft.

Also at North Freeny Jay Simmons is taking a drill-stem test at 1 Kidwell, C NE NE 23-8n-4w, with total depth at 10,998 ft.

New Prue Discovery Flows in Lincoln

Gene Graham Drilling Co. 1 Chas. Mitchell is a new Prue sand discovery in active Lincoln County, central Oklahoma.

The well, located 1 mile northwest of East Parkland pool production, is flowing 10 bbl. of oil per hour through 6/64-in. casing choke with an estimated flow of 3,096 M.c.f. of gas per day. The oil is 47.7° gravity. Gas-oil ratio is 2,355:1. The discovery is separated from nearest production by a dry hole.

Southwest Navina Pool Well Goes on Production

Success continues to follow the Macmillan Petroleum Corp., Blackwood & Nichols and Richard S. Rheem's Logan County Southwest Navina pool, as the 4 Krout, the third producing well in this field, was placed on production after flowing at the rate of 14.3 bbl. of oil per hour or 343.2 bbl. per day of 41°-gravity oil on a 20/64-in. choke. Open hole production was reached at an interval of 6,513 to 6,550 ft. in the second Wilcox sand. The production depth and Wilcox sand is similar to that of the field discovery well, 1

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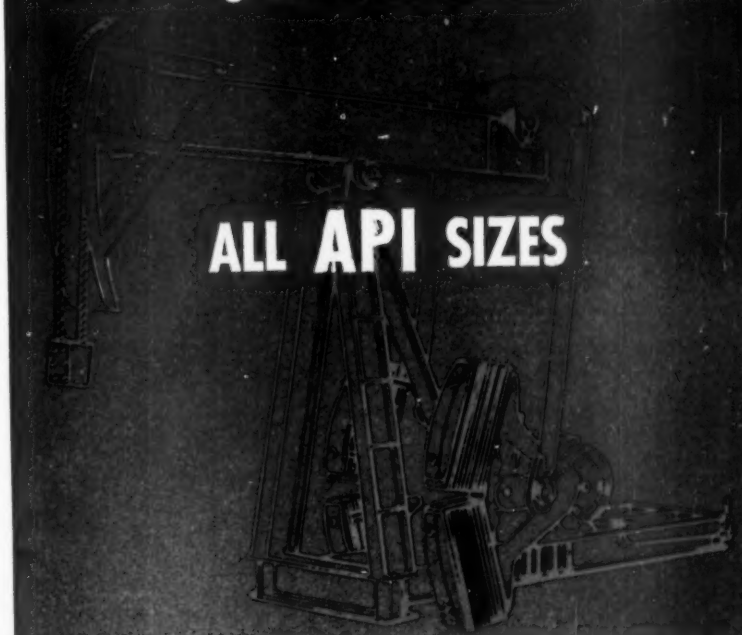

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Krout, which was brought in in February and flowed at the rate of 1,200 bbl. per day on 24/64-in. choke. To comply with the field quota allowed by the Oklahoma Corporation Commission, the 4 Krout has been pinched back to 150 bbl. per day.

In the same pool the 2 Berg is cemented at a depth of 6,550 ft. and is awaiting production test.

Production Tests Under Way at Cleveland Strike

Excellent results are reported on production tests in the Tulip Creek sand at Pure Oil Co. 1 Hobaugh, Cleveland County discovery in SE SW SW 30-8n-1w.

The well flowed 367 bbl. of oil in 5 hours on ½-in. choke. Tubing pressure was 100 psi. Later the well flowed 116 bbl. in 2 hours on same choke with tubing pressure 225 psi. Killing the flow the operator perforated casing at 7,893-7,940 ft. Former perforations were at 7,951-59 ft. With packer set at 7,871 ft. The well flowed 147 bbl. of oil per day from both intervals. The well is being prepared for permanent production status.

Wilcox Discovery in Payne Completing

A new Wilcox sand oil discovery is near completion at S. C. Yingling 1 Swarts, NW NE NE 32-20n-2e, Payne County. The well flowed gas in 3 minutes and oil in 24 minutes on drill-stem test at 4,713-33 ft. in the Wilcox sand. The estimated hourly rate of oil flow was up to 100 bbl. The discovery is in an area surrounded by five dry holes.

Additional Hunton Pay Found in Logan Discovery

British American Oil Producing Co. has uncovered more Hunton lime pay at their Logan County discovery, the 1 John S. Hughes, NW SW SW 24-17n-1e. A drill-stem test at 4,720-38 ft., open 13 minutes, flowed gas in 3 minutes and oil in 10 minutes. A previous test at 4,688-4,715 ft., open 14 minutes, flowed gas in 2 minutes at the estimated rate of 2,000 M.c.f. per day, with recovery being 40 ft. of clean oil. A 1-hour drill-stem test at 4,953-80 ft. recovered 4,320 ft. of gas and 35 ft. of gas-cut mud. Operator is now drilling ahead at 5,000 ft.

Fourth Flow Reported At Centrahoma Wildcat

Twin Oil Corp. has apparently reached the base of the Oil Creek sand pay at their 1 Cody, geological wildcat in Centrahoma pool, Coal County.

The well has flowed oil on the fourth test at 6,902-49 ft. Previously the well has flowed oil at 6,846-61 ft., 6,860-79 ft., and 6,882-99 ft. Flows have ranged up to 40 bbl. per hour. Successful completion of this well would make one of the best wells ever finaled in this section of Oklahoma.

MICHIGAN

Checking in favorable with some of the best producers in the pool, and with a natural flow reported of 75 bbl. of oil in 8 hours from the Traverse through 5-in. casing, R. W. Devine & J. W. Lang Co. 6 Nordwall, SW NE SE 25-9n-15w, Sullivan Township, Muskegon County, offered hope that Ravenna pool may be pushed even further to the west. Well topped Traverse lime at 1,830 ft. and pay showed at 1,832-36 ft., total depth. Tubing was being run in preparation for acid treatment. Well is on the extreme west central side of the pool.

Louis Zellman completed one of the best wells drilled to date in the Trowbridge field areas, Allegan County, and at the same time enhanced the outlook for additional development in his fairly new division of the field which centers around Section 13-1n-13w, and 18-1n-12w, Trowbridge and Otsego Townships, Allegan County. New producer was the Zellman 1 Wiley, NW SE SW 18-1n-12w, the furthest test drilled to the south in the current development. Well was reported to be flowing at the rate of 10 bbl. of oil an hour, after acid treatment with 500 gals. and with the aid of some pump agitation. It was

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estimated that the 1 Wiley would probably settle to about 40 bbl. of oil a day, based upon history of other area producers over a more extended test period. Traverse lime was logged at 1,601 ft. and hole was bottomed out at 1,604 ft. Well carried 400 ft. of free oil natural in 40 hours. The 1 Wiley is about ½ mile southeast of the discovery producer in this area of the pool and is about a ¼ mile north of an earlier failure.

In Lawton Traverse oil pool, Porter Township, Van Buren County, the Norman L. Stevens 3 Spencer, NE SE NW 8-4s-13w, was reported to be pumping and flowing 80 bbl. of oil a day natural from the Traverse at 1,200 ft., total depth. Top of objective Traverse was picked at 1,198 ft.

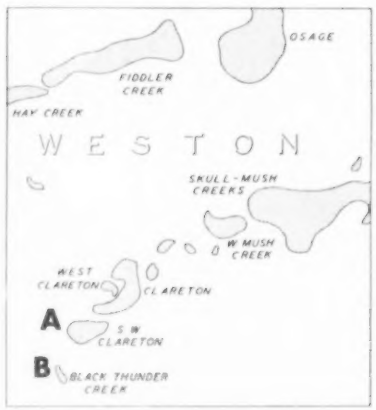
ROCKY MOUNTAIN

WYOMING

Weston County Stepout Flows at High Rate

York & Johnson are completing 1 Kirby, NE SE 4-42n-65w, in the south Clareton area, Weston County, after test of the Newcastle flowed at the rate of 70 bbl. of oil per hour. The well is slightly less than 1 mile from South Clareton production, and is within the rapidly developing trend of activity which has followed discoveries in the Black Thunder Creek and South Clareton areas earlier this year.

Three miles southwest of the 1 Kirby, C. B. Simmons has reported a flow of 200 bbl. of oil per day without treatment from 1 Government, SW NW NW 18-42n-65w, a wildcat along the active South Clareton trend. Testing is still in progress at this discovery, and the well may be sandfraced prior to completion.



Portion of Weston County in eastern Wyoming on the east rim of the Powder River basin. Three new discoveries and three indicated strikes recently in Weston County have made it one of the state's most active areas. Soutwest of Clareton production (A on map) Big Horn-Powder River Corp. and J. D. Sprecher 1 Wakeman, NE NW NE 1-42n-66w, opened a new field, sparking the rapid development program under way. Three flowing wells have been added to the promising field and stepout drilling is under way. In March Voss Oil Co. opened production in the Black Thunder Creek area (B on map) at 1 Scott, SW NW NE 23-42n-66w, and offsets and extensions have had excellent results. Recently a new pool was opened about 2 miles from Newcastle, 2½ miles east of production in Skull Creek field. This strike is located high on the eastern rim of the Powder River basin. One apparent discovery is located south of Black Thunder Creek and two others closer to Clareton.

Cottonwood Creek Unit Wildcat Testing

Stanolind Oil & Gas Co. swabbed 15 bbl. of oil and 20 of water in 7 hours at 1 Unit, C SW SW 2-47-91w. The well was drilled to 7,552 ft. total depth, and plugged back to 7,440 ft. Test was of perforations 7,270-94 ft., and the zone was acidized with 12,000 gal. at each of three treatments prior to swabbing. Phosphoria was topped at 7,273 ft. The wildcat is the first test of the unit which embraces nearly 33,000 acres.

Dickie Unit Test Has Phosphoria Shows

Stanolind Oil & Gas Co. is coring below 6,613 ft. at 1 unit, NW SW NW 25-45n-101w, in the Dickie Unit, Hot Springs County, after recovery of some oil on test of Phosphoria. Drill-stem test 6,571-93 ft. recovered 90 ft. of clean 22°-gravity oil and 120 ft. of heavily oil and gas-cut mud. Cores 6,560-93 ft. had shows in vugular, dolomitic limestone. The wildcat is proposed to test Madison at about 7,000 ft. Phosphoria top was called by sample at 6,562 ft.

COLORADO

Lyons Discovery Completed

The California Co. has completed 1 Baiamonte, SE NE NW 6-7n-66w, in the Black Hollow area of Weld County for a pump gage of 304 bbl. of oil per day. Production is from Lyons sand (Permian) from the open hole zone 8,918-40 ft. The wildcat is the second Permian discovery completed in the Denver-Julesburg basin. The initial discovery below Cretaceous was made earlier this year in Keota field, Weld County. Since completion it has begun to make water with the oil in substantial quantities. No water was recovered on test of the 1 Baiamonte. The California Co. has begun operations on a second well in the area, 1 UPRR, NE SW SW 31-8n-66w.

Deep Test Scheduled South of Denver

McElroy Ranch Co. has announced intention to drill a deep test in the portion of the Denver-Julesburg basin south and west of the city of Denver. Location for the wildcat, not yet announced in detail will be about 6 miles southwest of the town of Littleton. The well will go to Dakota at about 10,000 ft. It will be of interest as the first test to this depth in this area of the basin. Operaions are scheduled to commence within about 10 days.

NORTH DAKOTA

Mercer County Deep Wildcat Staked

Williston Oil & Gas Co. has taken a farmout from Deep Rock Oil Corp. and has staked location for 1 Boeckel, C SW SW 10-144n-88w, Mercer County, for a Mississippian test to about 9,000 ft. The new wildcat is 16 miles northeast of a failure drilled by Plymouth Oil Co. at 1 Luetz C

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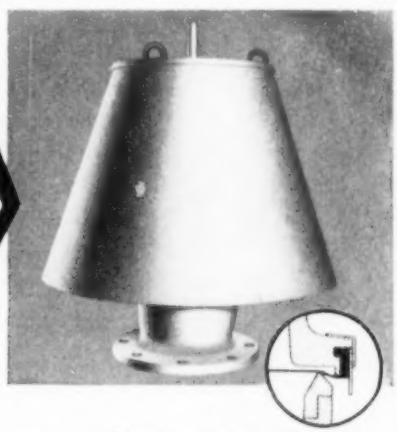

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NW NE 28-142n-89w in 1950. There were no shows in the earlier well.

MONTANA

Brorson Area Discovery Is Completed

Sun Oil Co. and Phillips Petroleum Co. have completed their joint discovery 1 Dynneson, C SW NE 32-24n-58e, in the Brorson area of Richland County for a flow of 745 bbl. of oil per day through 20/64-in. choke from Red River (Ordovician). Production is through perforations from 12,585 to 12,605 ft. and test followed acidization with 2,000 gal. in that interval.

The wildcat is the first test of a 35,000-acre block northwest of the town of Sidney, with Sun Oil holding a five-eighths interest. It was established as a possible commercial producer several weeks ago, but continuing tests prior to acidization had recovered oil at the rate of only about 100 bbl. per day, a discouraging gage at the depth of the well. The well had continued to clean up during later testing, and responded well to acid. It is the deepest well ever drilled in Montana, and is important as the first test of a seismic prospect away from a known surface structure in the Williston basin to indicate commercial production. The second such discovery was Amerada Petroleum Corp.'s 1 May in the Fryburg area of Billings County, North Dakota. The Brorson area discovery is in an area which has had very little previous drilling, and is in the general central area of the Williston basin.

Musselshell County Morrison Discovery Tested

Since discovery of oil in the Montana portion of the Williston basin there has been an expanding trend of activity through the central Montana area west of the Williston basin proper as an apparent corollary of the exploratory campaign in Williston prospects. At least two discoveries have resulted, with another apparent discovery now being tested.

The Chicago Corp. and Republic Natural Gas Co. recovered oil at the rate of about 2 bbl. per hour on test of 1 NPRR, SW SE NE 17-11n-31e in the Ivanhoe area of Musselshell County. The well was drilled to a total depth of 5,208 ft., in Charles, and was plugged back to 2,874 ft. for completion. Test was run of perforations 2,796-2,806 ft. There was gas at the surface after 2 hours, and oil flowed at the end of 2 hours and 40 minutes.

The operators estimate a pump potential of about 300 bbl. per day. The discovery is just east of Ragged Point field and about 7 miles northwest of Northwest Sumatra field where lower Amsden production was established in 1952. There has been no previous production from Morrison in Montana with the exception of that in a few older wells in Cat Creek field about 15 miles to the north.

Carbon County Discovery Flows in Greybull

Carrol J. Kirk has reported a flow at the rate of 16 bbl. of oil per hour at 1 Stow, NW NW NE 14-7s-22e, Greybull sand discovery on Golden Dome, Carbon County. The well was tested for a 20-hour period through 3/8-in. choke. Production is through perforations 5,854-66 ft.

The discovery is 4 miles west of Dry Creek field, and oil produced is approximately 54

KANSAS

Trego Discovery Goes On Pump for New Pool

Pam-Kar Drilling Co. is putting a new discovery in Trego County on the pump after swabbing resulted in 3 bbl. of oil per hour after fracture treatment of conglomerate perforations at 3,818-27 ft.

The 1 Hixson, NW NW NE 19-11s-22w, is located in Trego County on the western flank of the Central Kansas uplift. The strike is 1 mile east of East Wakeeney pool.

Wildcats Staked in Southern Counties

New wildcats are reported for southern Kansas counties as part of an active exploratory program.

Deep Rock Oil Corp. is drilling a wildcat 6 miles south of Conway Springs in Sumner County at 1 Martin, SE SE SW 26-31s-3e. Also in the same area Herndon Drilling Co. will drill 1 Rusk, SE NE NW 12-33s-1w, east of Perth pool. The Texas Co. has a wildcat under way in Harper County at 1 Bird, NW NW SE 21-34s-5e, west of Bluff Creek. Bennett Bros. 1 Davis, SW NW NW 34-31s-6e, is a new Cowley wildcat. In the Hugoton embayment J. M. Huber Corp. will drill 1 Breeding, NE SW NW 18-31s-40w, in Morton County, and 1 Blucher, SW SW NE 13-35s-31w, Seward County.

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CALIFORNIA

Superior Testing Shows In Deep Cymric Well

Superior Oil Co. was attempting to establish production in a new 7,250-ft. pay after mechanical difficulties halted drilling at 12,022 ft. in its deep test of the old Cymric field, westside San Joaquin Valley. On August 17 hole had been plugged back to 7,295 ft. and the interval 7,238-77 ft. was being swabbed. Casing had been set at 7,430 ft.

The test, 1 Cymric Unit in SE SE 22-29s-21e, for a short period flowed 2 bbl. of oil per hour through perforations at 7,305-25 ft. Water broke in, however, so that hole was further plugged. When the well had reached a depth of 6,530 ft. last March, a formation test resulted in the recovery of 4,442 ft. of muddy, gassy oil.

Mountain View Activity

The deeper pool discovery by M J M & M Oil Co. last April on the west edge of Mountain View field, Kern County, continued to attract attention. Standard Oil Co. of California was in process of completing 1 Wible as a southeast extensioner in the 7,300-ft. Nozu sand. About 1½ miles east of this activity in 23-30s-28e, M J M & M 1 Blackburn, an old dry hole being deepened in search of the new pay zone, had reached a depth of 6,326 ft. In Section 9, about 2 miles northwest, Union Oil Co. 96 Kernco was drilling below 7,750 ft.

A new shallow fault-block discovery in the Edison area evidently was scored by Standard 1 Jeppi in 17-30s-29e, about ½ mile from nearest production. The well flowed 132 bbl. of 23°-gravity crude daily through a 24/64-in. choke, production being from the Jeppi sand at 4,134-88 ft. It is approximately ½ mile east of a Jeppi producer completed last June by Barratt & Bysshe.

Beehive Bend Extended

Sunray Oil Corp. completed 1 Cushman as a 1-mile northeast outpost to the discovery well of Beehive Bend gas field in Glenn County, northern Sacramento Valley. The wildcat, in SW NE 18-19n-1w, flowed 3,310 M.c.f. of gas through a 20/64-in. choke from the perforated interval 4,485-4,574 ft. The discovery well, 1 Friesen, was completed in July for 6,000 M.c.f. daily at a similar depth.

New Wheeler Ridge Pay

Standard Oil Co. of California completed 42 K.C.L.-33 in SW NE 28-11n-20w, to give Wheeler Ridge field, Kern County, a new Olcese sand pool. With hole plugged back to 4,048 ft. it flowed 250 bbl. of 31°-gravity crude through a ½-in. bean. Production was through perforations at 3,986-4,046 ft. Several earlier Eocene wells drilled by Richfield Oil Corp. had shown the Olcese to be productive but this was the first completion in the zone.

Torrey Canyon Tests

Union Oil Co. 92 Torrey in Torrey Canyon field of Ventura County was coring at near the 14,000-ft. mark, after already having indicated it would make a deeper pool discovery in a 13,000-ft. Eocene pay. About ½ mile west, in 6-3n-18w, The Texas Co.

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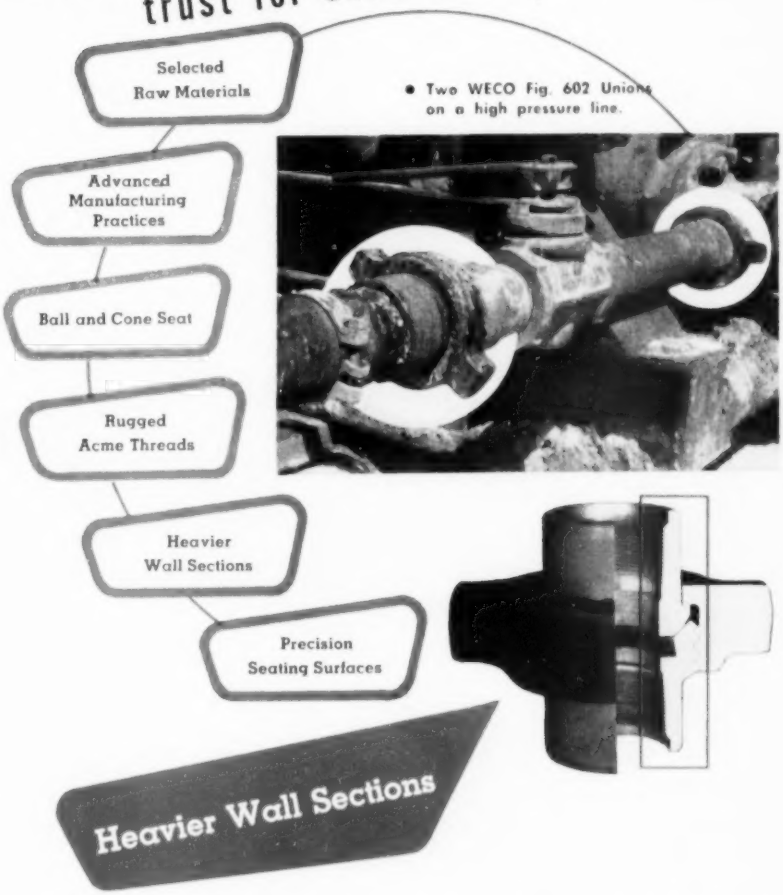

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2 Hunter was below 6,000 ft. in drilling for the field's regular 9,500-ft. Sespe pay.

MISSISSIPPI

Wilcox Search Uncovers New Adams County Field

Wilcox exploration in southwestern Mississippi, principally in Wilkinson, Adams, and Jefferson counties, has uncovered another field, the sixth so far this year. Latest discovery is in southeastern Adams County, approximately 1¼ miles southeast of the Pellucid Bayou field, a Wilcox producer opened in July 1951.

The new field, discovered by Jett Drilling Co. and R. J. Bartlett, has been named Levees Creek. The discovery well, 1-C Minter, in 20-5n-1w, flowed 131 bbl. of 41°-gravity oil in 24 hours on potential test through 9/64-in. choke, gaging 550 psi. pressure on the tubing. Production is from the Minter zone with casing perforated at 6,689-91 ft. Hole had been drilled to 6,999 ft.

Other Wilcox discoveries in southeastern Mississippi this year include Anna and Shieldsboro, in Adams County; Idlewilde, Jefferson County; and Saukum and South Possum Corner, Wilkinson County.

CANADA

Oil Discovery Seen For Burdett Area

There was only one oil discovery in western Canada during the past 7 days operations—at a venture in the Burdett area of southern Alberta, 37 miles southwest of Medicine Hat and 55 miles east-northeast of Lethbridge.

This medium-gravity oil discovery well (oil is 23° to 26°), found its product in the Ellis sand formation during drill-stem test from 2,968-78 ft. Recovery was 2,080 ft. of clean oil. A further 10 ft. has been cored, but as yet untested. Core recovery was 7 ft. of clean oil-saturated sand. Amount of oil pay zone so far penetrated is estimated at between 10 to 20 ft., but as yet it is now known where the top of that pay was contacted. Indications are, however, that a commercial producer will result.

The well was drilled by Rio-Prado Consolidated Oils, Ltd., on an approximate 32,000-acre crown reservation, and site of the discovery, is LSD 13, 22-10-12w4, 7 miles southeast of the Grassy-Glenphyll Ellis sand oil strike. Coring and testing is being continued.

Southeast Midway . . . Also this week a discovery well in the Southeast Midway area of southwest Saskatchewan carried out its initial swabbing tests, and rated oil at 6 bbl. hourly from the upper Shaunavon (or Hulett section) of the Jurassic—a sand formation. This well, owned by the Socony-Woodley-Southern Production team, is located in LSD 1, 3-14-19w3, 3½ miles north of Gridoil's Gull Lake (North) oil producers and 7¾ miles from other Socony group oil wells in this general Swift Current region.

Production tests were run from the perforated interval 3,756½-61½ ft., following a 500-gal. acid wash. Gravity of the oil is 21.7° (medium) and well is now shut in pending market arrangements for the crude. Around 20 ft. of oil pay zone was encountered at the well.

Ponoka area . . . Texaco Exploration Co.'s Ponoka area wildcat that discovered natural gas and sprayed crude oil during drill-stem tests in the basal quartz section of the Lower Cretaceous will likely be completed as a gas well. That well flowed gas at rates in excess of 6,000,000 cu. ft. daily during tests, and on the basis of log and drill-stem information only a thin non-commercial oil zone was encountered below the gas cap.

This strike, chalked up during June 14, is Texaco A-1 Ponoka, LSD 3, 24-43-26w4, 4 miles northwest of Ponoka and 55 miles south of Edmonton. Hole was taken down to 7,960 ft. to test the horizons below the basal quartz, set string of casing and the basal zone was perforated from 5,266-67 ft. Swabbing brought only salt water, at rate of 10 bbl. hourly. Hole is currently shut in, and crew will likely perforate higher in the formation, to test the gas zone.

EASTERN CANADA

Gaspe . . . In the Gaspe peninsula, Quebec Province, Bald Mountain 2 is still in hard formation below 5,618 ft. and testing for coral reef indications.

On the Galt Brook dome, Continental 1 Deep Test is cleaning out caving at 3,085 ft. after a shot to correct a diversion from the vertical. Oil and gas shows continue from 2,754-99 ft. The 1 Asphalt Base, making oil and gas from 1,197-1,200 ft., is deepening in a hard but porous formation below 1,330 ft.

Quebec Oils 2 is in a hard formation with shale bands below 5,873 ft. and believed nearing another porous zone. The 1 Tar Point is standing at 7,069 ft.

APPALACHIAN AREA

OHIO

Another producer on an outside location was added to Mount Zion pool by the Mutual Oil & Gas Co. 9 Wheeler Johnson,

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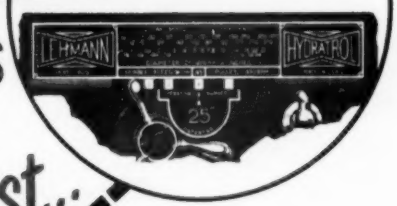

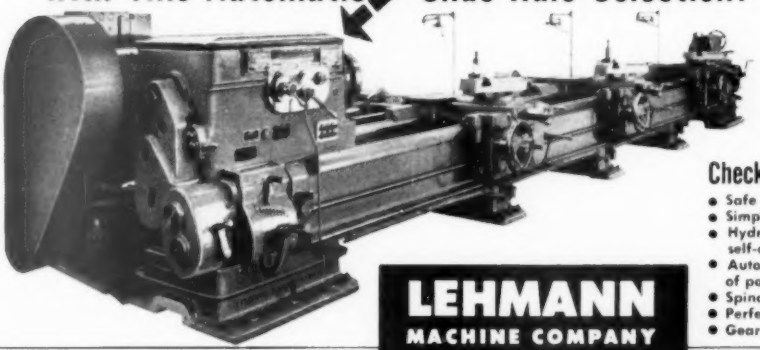

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Section 5, Fallsbury Township, Licking County. Clinton sand at 2,718-61 ft. made a good showing of oil natural, and 201 bbl. in 24 hours after fracturing. Along the east side of the pool, Mid East Co. 6 Bertha Montgomery, Section 23, Jackson Township, Knox County, made 108 bbl. in 24 hours after treatment. Clinton was logged at 3,040-93 ft.

A short extension to Layland pool in Clark Township, Coshocton County, was made by Patten et al. on 6 Edward Myers, Lot 27. Clinton at 3,480-99 ft. was fractured and produced 50 bbl. per day.

KENTUCKY

EASTERN KENTUCKY

On Greasy Creek and in the Pike County sector of Big Sand gas field, W. W. Lindsey has completed 1 R. P. Coleman for a combination Maxon sand & Devonian shale gas well. Maxon sand gaged at the rate of 377,000 cu. ft. of gas daily and the shale at the rate of 200,000 cu. ft. daily. Total depth of test was logged at 4,193 ft.

In Pike County and on the waters of Cabin Fork, Riley and Scott have completed 5 Henry Horn for an open flow potential of 400,000 cu. ft. of gas daily from Devonian black shale at a depth of 3,871 ft. Well is located in Big Sandy gas field.
gravity.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Bell County: Alvin Shambeck et al 1 Baugh, J. N. Arocha Sur. Dry. TD 1,110 ft.

Brooks County: J. P. Petkas et al 1 Casey et al, J. T. Maupen Sur. 631. Dry. TD 6,742 ft.

Sinclair Oil & Gas Co. 1 Stockton, H. Acebedo Sur. 424. Dry. TD 6,250 ft.

Vaughn, Zoch & Turnbull et al 1 Lasater, F. Guerra Chaps Sur., A-98. Dry. TD 7,514 ft.

Duval County: The Texas Co. 1-B DCRC NCT 56, GC & SF Sur. 259, A-1069. IPP 20 BOPD, 20°, casing perforations 1,833-41 ft. TD 2,711 ft.

Jim Hogg County: William E. Colson and J. H. Walker 1 Yeaker, Sur. 167, A-28. Dry. TD 3,275 ft.

Panhandle Oil Corp. 4 Hellen, Duval County School Land Sur. 150. Dry. TD 3,142 ft.

Jim Wells County: La Gloria Corp. 30 C.H.F. Blucher, Sur. 363-A. IP 84.1 BOPD, P-37 ch., 42°, casing perforations 6,302-12 ft. TD 8,505 ft. (New pay in Tijerina-Canales-Blucher field.)

H. J. Mosser 3 Holmes, L. G. Collins Farm Lot Subd., Comanche Creek Irrigation Co. Sur., Lots 25 and 26. Dry. TD 5,550 ft.

W. Earl Rowe 2-B Embleton, La Tinaja de Lara Grant. IP 139.2 BOPD, ⅛-in., 42.1°, casing perforations 5,296-99 ft. TD 5,400 ft. (New field-Rowe.)

W. Earl Rowe 1 Pablo Perez, Share 4, La Tinaja de Lara Grant. IP 8,000 M.c.f. daily, open flow, casing perforations 5,286-92 ft. TD 5,431 ft.

Kenedy County: Sun Oil Co. 4 McCampbell, J. S. Boyles Sur. IP 12,000 M.c.f. daily, open flow, Marginulina 7,260-65 ft. (casing perforations.) TD 7,399 ft. (Extends Murdock Pass field.)

McMullen County: Otis S. Bowers and William H. Martin 1 Nueces, T. Rosiene Sur. 168, A-994. Dry. TD 1,306 ft.

Medina County: R. O. Mangum 1 Bailey, H. Castro Sur. 367. Dry. TD 881 ft.

Nueces County: Arkansas Fuel Oil Corp. 1-C Wilson, William Little Sur. 324, A-212. Dry. TD 8,365 ft.

Austral Oil Exploration Co., Inc., 1 State, Tract 17, Corpus Christi Bay. IP 32,800 M.c.f. daily, open flow, casing perforations 8,606-14 ft. TD 9,850 ft. (Extends Corpus Christi Bay field.)

Puenticitas Oil Co. 1 Countiss, Partition of Wright Lands, Share 3. IP 127 BOPD, 7/64-in., 41°, casing perforations 6,338½-40 ft. TD 7,466 ft. (New pay in North Agua field.)

Southwestern Oil Refining So. 1 Ruegg et al, George H. Paul "D" Subd., Section 17, Driscoll Ranch. IP (tubing completion) 80,000 M.c.f. daily, open flow, plus 15 BC per million cubic feet, 59.2°, casing perforations 6,904-07 ft., and (casing completion) 22,000 M.c.f. daily, open flow, plus 5 BC per million cubic feet, 56°, casing perforations 5,603-06 ft. TD 7,470 ft. (New field-South Robstown.)

San Patricio County: Ben F. Vaughn, Jr., and F. P. Zoch 1 Picha, Section 54, George H. Paul Subd., Coleman Fulton Pastrure. Dry. TD 7,900 ft.

Starr County: Bass & Vessels 2 Baird et al, Tract 48, Porcion 84. IP 37.95 BOPD, 10/64-in., 26.3°, casing perforations 1,922-27 ft. TD 1,929 ft. (New field-North El Tanque.)

T. R. Cunningham 2 Martinez, Share 12-D, Porcion 71. Dry. TD 1,010 ft.

Willacy County: Humble Oil & Refining Co. 8 Sauz Ranch Tenerias, San Juan de Carrocitos Grant. Dry. TD 8,203 ft.

Wilson County: Leroy C. Cockrell 1 McCracken, L. Manchacha Grant, A-18. Dry. TD 4,150 ft.

O. G. McClain 1 Houston, J. Ximines 215, A-369. Dry. TD 6,215 ft.

Republic Natural Gas Co. 1 Mueller, Maria Antonia Rodriquez Sur. 40, A-266. Dry. TD 5,228 ft.

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Zavala County: Phillips Petroleum Co. 1 Zavala, I & GN Sur. 24. Dry. TD 7,515 ft.

TEXAS GULF COAST

Brazoria County: Plummer & Townsend 1 Wood, HT&B Sur. 57, A-289. Dry. TD 8,257 ft.

DeWitt County: Pan American Production Co. 1 Duderstadt, N. J. Ryan Sur., S-402. Dry. TD 8,044 ft.

Goliad County: M. E. Andrews 1 Fromme, Noah G. Stebbins Sur., A-256. Dry. TD 4,836 ft.

M. E. Andrews, Ltd., and Dallas Husky 1 Gurley, M. Tippen Sur., A-466. Dry. TD 3,452 ft.

Kirkwood & Morgan, Inc., 1 Jessie Power heirs, William Lavery Sur. Dry. TD 4,416 ft.

Grimes County: J. Ray McDermott 1 Burrow, Jesse B. McNealy Sur., A-44. Dry. TD 9,952 ft.

Harris County: Austral Oil Exploration Co. 1 Bauer, WCRR Sur. 13, A-915. Dry. TD 8,207 ft.

Texas State Drilling Co. 1 Kosina, Thomas Toby Sur., A-809. IP 87 BOPD, 7/64-in., 35.8°, casing perforations 8,300-03 ft. TD 9,048 ft. (Extends South Rankin field.)

Liberty County: Hassie Hunt Trust 2 Boyt et al, T&NO Sur. 34, A-374. Dry. TD 8,600 ft.

Live Oak County: Harry Hotchin 1 Boyd, John Hefferman Sur., A-11. Dry. TD 1,625 ft.

Matagorda County: Magnolia Petroleum Co. 2 Savage, J. C. Peyton Sur., A-74. IP 2,251 M.c.f. daily, 12/64-in., casing perforations 9,668-73 ft. TD 12,005 ft. (New pay in Wadsworth field.)

Montgomery County: Texmo Oil Co. et al 1 Hutchings-Sealy National Bank, J. C. Pitts Sur. IP 3,020 M.c.f. daily, open flow, Wilcox 10,622-40 ft. (casing perforations). TD 11,828 ft. (Extends North Conroe area.)

Orange County: Richard M. Wright 1 Sikes, Theron Strong Sur., A-26. IP 15,000 M.c.f. daily, open flow, casing perforations 8,408-16 ft. TD 9,215 ft. (Extends Echo field.)

San Jacinto County: Cities Service Production Co. 1 Frazier & Campbell, Jose de la Garza Sur., A-18. Dry. TD 11,522 ft.

Walker County: Chambers Drilling Co. et al 1 Gibbs Brothers, Elizah Anderson Sur., A-2. IPP 74 BOPD, 42.6°, casing perforations 4,563-66 ft. TD 5,335 ft. (New field.)

Wharton County: Johnson & Appling 1-C Kountze & Stewart, L. L. Miller Sur. 7. IP 6,200 M.c.f. daily, open flow, lower Frio 6,770-75 ft. (casing perforations). TD 7,389 ft. (New pay in East Mauritz field.)

EAST TEXAS

Cherokee County: Gant & Rexall Drilling Co. et al 1 John Hamilton, James Hamilton Sur., A-23. Dry. TD 4,076 ft.

Mack Hays, Jr. 1 B. F. Dickey, John Durst Sur., A-15. Dry. TD 5,610 ft.

Harrison County: Hollandsworth Oil Co. 1 W. E. Odum, Henry Vardaman Sur., A-726. Dry. TD 7,002 ft.

Wood County: Andrew V. Erwin Associates 1 Methodist Church, M. Gause Sur., A-247. Dry. TD 6,380 ft.

F. R. Jackson 1 O. W. Smith, S. English Sur., A-184. Dry. TD 5,631 ft.

WEST CENTRAL TEXAS

Brown County: Hanco Oil & Gas Co. 1 Zena Howell, J. M. Harris Sur. 784, IPP 26 BOPD, 33°, pay 1,194 ft. TD 1,260 ft.

Callahan County: American Liberty Oil Co. et al 1-A Isenhower, Sec. 7, BOAL Sur. Dry. TD 4,110 ft., elev. 1,706 ft., Ellenburger 4,032 ft.

C. T. Grubb 1 Kate Womack, Sec. 64, Comal CSL. Dry. TD 2,962 ft.

R. J. McQuarrie 1 Charles Straley, Sec. 370, G. W. Denton Sur. Dry. TD 4,468 ft.

Ken Woods Co. 1 J. M. Hooks, Sec. 55, BBB&C. Dry. TD 1,995 ft.

Coleman County: Anzac Oil Corp. 2 Josephin Ballard, D. W. Cloud Sur. 713. IP 52 BOPD, 15/64-in., 37°, pay 2,410 ft. TD 2,423 ft.

Hissom Drilling Co. 1 Carl Ashmore, 751-12-M. Martinez Sur. Dry. TD 1,597 ft.

Sid Katz Exploration Co. 1 T. L. Stevens, Sec. 20, HT&B. Dry. TD 2,340 ft.

M & L Drilling Co. and Well Servicing Co. 1 Morrison, Sec. 37, BBB&C. Dry. TD 3,336 ft.

W. J. Murray and J. J. Collins & Co. 1 Elkins, TE&L Sur. 69. Dry. TD 3,455 ft.

Fisher County: A. W. & Blair Cherry 1 W. I. Martin, 106-1-H&TC. Dry. TD 5,482 ft., elev. 1,873 ft., Strawn 5,355 ft.

B. M. Hester & Son 1 Gena Dooley, 176-3-H&TC. IP 240 BO in 16 hr., ½-in., 41°, Caddo pay 6,785-6,801 ft. TD 6,812 ft.

Jones County: Broday Drilling Co. 1 L. K. Thomas, 5-9-G&M. Dry. TD 2,775 ft.

R. O. Coe 1 T. H. Harp, 7-16-T&P. IPP 36 BOPD, 36°, Saddle Creek lime 2,065 ft. TD 2,260 ft.

Robinson & Puckett 1 Hammock, 3-1-T&NO. IPP 90 BOPD, 40°, sand pay 2,541 ft. TD 2,561 ft. New pay in Hammock field.

Robinson & Puckett 1 Laura D. Hooper, 3-1-T&NO. Dry. TD 3,444 ft.

Nolan County: The Chicago Corp. 1 C. E. Boyd, 62-20-T&P. IP 145 BOPD, 3/8-in., Ellenburger 5,918-32 ft. TD 5,940 ft.

General Crude Oil Co. 2 Cochran, 144-1A-H&TC. Dry. TD 4,154 ft.

Palo Pinto County: L. J. Hartnett 1 Costello, Peter Miller Sur., A-312. IP 95 BOPD, 14/64-in., 40°, pay 1,699 ft. TD 1,708 ft.

Shackelford County: Grisham Hunter Corp. 1 R. B. Elliott, Sec. 19, LAL Sur. Dry. TD 4,339 ft.

Clyde Nelson 1-B Baker, Sec. 210, ETRR. Dry. TD 1,935 ft.

Perini & Sandefer 2 Hendrick Ranch, Sec. 179, ETRR. IPP 18 BOPD, 39°, pay 1,179 ft. TD 1,230 ft.

Stephens County: J. W. Marshall 1 W. G. Cockrell, Sec. 1440, TE&L. Dry. TD 4,421 ft., elev. 1,334 ft., Ellenburger 4,397 ft.

Stonewall County: Pure Oil Co. 1 Nan Smith, 344-2-H&TC. Dry. TD 4,588 ft., elev. 1,887 ft., Ellenburger 6,648 ft.

Taylor County: C. M. Ashby 1 B. B. Thurman, Hood CSL. Dry. TD 4,550 ft.

Childress Drilling Co. 1 R. W. Tucker, Sec. 7, Wm. Bell Sur. 425. Dry. TD 4,257 ft.

Continental Oil Co. 1 Frances Sears Shelton, 228-64-H&TC. Dry. TD 5,767 ft.

Sidney H. Davis 1 N. T. Zachery, Sec. 35, LAL. Dry. TD 4,360 ft.

Throckmorton County: E. R. Perkins 1 J. L. Wright, TE&L Sur. 2,112. IPP 16 BOPD, 39°, pay 4,388 ft. TD 4,396 ft.

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NORTH TEXAS

Archer County: J. Earle Gray 1 Turbeville, Blk. 39, Jefferson CSL. Dry. TD 1,141 ft.

Hudson-Dietrich Oil Co. 1 Calvin, H. Grooms Sur., A-155. Dry. TD 980 ft.

W. A. Lofton 1 Sallie B. Dycus, Sec. 1895, TE&L Sur. Dry. TD 3,117 ft.

Ted A. Norwood 1 T. B. Wilson, John Harris Subd. Dry. TD 1,331 ft.

Woodson Oil Co. 1 H. T. Haile, TE&L Sur. 2419. Dry. TD 5,423 ft., elev. 1,298 ft., Mississippian 5,169 ft., Ellenburger 5,413 ft.

Clay County: S. D. Johnson 2 Whitsett, T. F. Johnson Sur., A-762. Dry. TD 3,377 ft.

Cooke County: Brown & Martin 1 B. H. Watson, N. Trevino Sur., A-1021. Dry. TD 1,213 ft.

A. R. McElreath 1 E. C. Mead, S. Willis Sur., A-1102. Dry. TD 3,200 ft.

Sussex Oil Co. 1 Moore, W. C. Twitty Sur., A-1023. Dry. TD 3,207 ft.

Grayson County: Howell, Holloway & Howell 1 Anderson, I&GN Sur., A-1440. Dry. TD 6,250 ft.

Shell Oil Co. 1 Collums Estate, J. Toby Sur., A-1056. IPP 65.6 BOPD, 40°, pay 6,653-75 ft. TD 7,799 ft.

Jack County: M. E. Andrews 1 Tom Davis, J. F. Walker Sur., A-1203. IP 175 BOPD, 22/64-in., 41°, Bend conglomerate 5,570 ft. TD 4,880 ft.

Walter L. Plemons Production Co. 1 Rhodes, C. J. Clark Sur., A-2106. Dry. TD 5,010 ft.

Star Oil Co. 1 C. L. Gage, J. B. Irvine Sur., A-312. Dry. TD 5,337 ft.

Knox County: Humble Oil & Refining Co. 1-S W. T. Waggoner Estate, 5-K-M. M. Thompson Sur. Dry. TD 6,297 ft.

Montague County: Delfern Oil Co. 1 S. H. Hipp, Blk. 15, Harriett Brown Sur., A-13. Dry. TD 7,100 ft.

David F. Lawrence 1 Jerome Stone, Sec. 5, HT&C. Dry. TD 5,986 ft.

Miami Operating Co., Inc. 1 McDonald, Sec. 45, TE&L Sur., A-248. IP 321 BOPD, 32/64-in., 44°, conglomerate 5,865-75 ft. TD 6,027 ft.

Konrad Sztykgold 2 H. C. Bradley, Sec. 10, MEP&P, A-517. Dry. TD 6,140 ft.

Wilbarger County: Frank Wood 1 W. T. Waggoner "Xmas," Sec. 3, A-531. Dry. TD 2,505 ft.

Young County: Moncrief & Eddleman Oil Co. 2 Wainscott, Sec. 285, TE&L. IPP 61 BOPD, pay 2,978 ft. TD 3,000 ft.

L. E. Perkins, Jr. 1 L. C. Young, TE&L Sur., A-481. IPP 25 BOPD, 39°, pay 991 ft. TD 995 ft.

Rocket Oil Co. 1 C. W. Hinson, B. Hammond Sur., A-1320. IPP 36 BOPD, 40°, pay 2,125 ft. TD 2,245 ft.

SOUTHEAST NEW MEXICO

Chaves County: Republic Natural Gas Co.

WILDCAT COMPLETIONS

ft., elev. 3,715 ft., Mississippian 6,795
1 J. P. White, 9-11s-28e. Dry. TD 7,135 ft., Devonian 7,105 ft.
Lea County: Cities Service Oil Co. 1 State AM, 3-14s-32e. Dry. TD 240 ft.
R. Olson Oil Co. and Skelly Oil Co. 1 Lea Carter, 23-20s-38e. Dry. TD 9,543 ft., elev. 3,577 ft., Ellenburger 9,505 ft.
Texas-Pacific Coal & Oil Co. 1 Dry Lake Unit, 33-13s-22e. Dry. TD 12,675 ft., elev. 4,346 ft., Pennsylvanian 8,745 ft., Mississippian 11,730 ft., Devonian 12,440 ft.

WEST TEXAS

Coke County: Tide Water Associated Oil Co 1 Demere, 2-Z-D&SE. Dry. TD 7,777 ft., elev. 1,555 ft., Ellenburger 7,712 ft.
Crockett County: Continental Oil Co. 2-C Harris, 4-BB2-Francis Boren Sur. IP 364 BOPD, 14/64-in., 47°, Strawn pay 8,053 ft. TD 8,247 ft., elev. 2,846 ft.
Crosby County: Plymouth Oil Co. 1 E. M. Wahlenmaier, W. W. Watts Pre-Emption Sur. 7. Dry. TD 8,832 ft., elev. 2,701 ft., Ellenburger 8,792 ft.
Hale County: Russell Maguire 1 L. C. Wheeler, 51-A4-EL&RR. Dry. TD 9,510 ft., elev. 3,390 ft., Strawn 8,920 ft., Bend 9,485 ft.
Howard County: J. D. Wrather, Jr. 1 John Guinn, 40-34-T1S-T&P. Dry. TD 4,505 ft.
Martin County: Phillips Petroleum Co. 1-C Schar, Lge. 324, LaSalle CSL. IPP 59 BOPD, 40°, Wolfcamp 8,940 ft. TD 13,140 ft.
Runnels County: Ab-Tex Drilling Co. and Twin Oil Corp. 1 Billy Hanks, H. Chapman Sur. 499. Dry. TD 4,805 ft.
Geochemical Surveys 1 M. H. Kurtz, T. R. Webb Sur. 537. Dry. TD 4,205 ft.
Thos. D. Humphrey & Sons 1 Thomas C. Hall, Blk. 153, ETRR Sur. IP 81 BOPD, 18/64-in., 38°, Garner 3,848 ft. TD 4,793 ft.
Lee Bros. and Ronald Perkins 1 Laura Black, D. P. Richardson Sur. 462, A-415. Dry. TD 5,443 ft.
Murray Petroleum Co. 1 Annie Cox, Sec. 41, J. H. Gibson Sur. Dry. TD 3,973 ft.
Slick-Moorman Production Co. 1 Gerhart, Subd 2, J. H. San Miguel Sur. 72. Dry. TD 4,024 ft.
Sojourner Drilling Co. 1 McCord, Sec. 126, A. S. Clayton Sur. IP 195 BOPD, 20/64-in., 40°, pay 3,715-19 ft. TD 3,905 ft.
Sterling County: Harry J. Russell 1 L. C. Clark, 32-11-SPRR. Dry. TD 1,220 ft.
Ward County: Argo Oil Corp. 1-B John Olson, 191-34-H&TC. IP 80 BOPD, ⅜-in., 39°, Delaware sand pay 4,920 ft. TD 5,076 ft.
Yoakum County: Livermore Drilling Co. et al 1 J. V. Been, 345-D-J. H. Gibson Sur. Dry. TD 12,000 ft., elev. 3,783 ft., Bend 10,820 ft., Mississippian 11,260 ft., Devonian 11,955 ft.

ILLINOIS

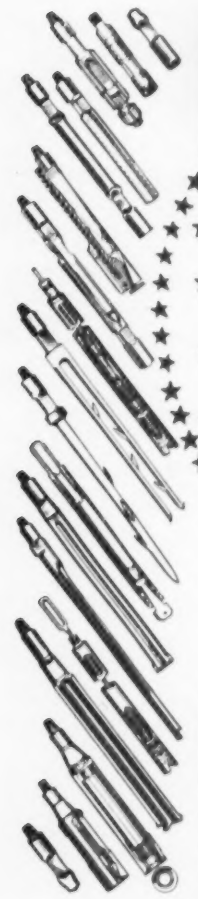
Clay County: Marion Partlow 1 Workman, NW SW NE 30-5n-8e. Dry. TD 3,008 ft.
Clark County: Juan Petroleum Co. 1 Step, S½ SE SW 17-11n-10w. Dry. TD 2,151 ft.
Gallatin County: Whaley Oil Co. 1 Hale, NW NE NE 26-7s-8e. Dry. TD 3,103 ft.
Hamilton County: Calvert Drilling Co. 1 Gray-Smith Unit, SE NW SW 1-7s-5e. Dry. TD 3,431 ft.
Madison County: The Texas Co. 1 Carroll, SE SW NE 32-5n-6w. Dry. TD 1,886 ft.
Perry County: Jet Oil Co. 1 Schwarz, NW NW SE 25-5s-4w. Dry. TD 2,834 ft.
Shelby County: McDaniel & Workman 1 Clark, SW SW NW 21-12n-2e. Dry. TD 2,872 ft.
Wayne County: Calvert Drilling Co. 1 Michels, SE SE NW 33-2n-7e. Dry. TD 3,221 ft.
Ashland Oil & Refining Co. 1 Cunningham, SW NW SE 22-2n-6e. Dry. TD 3,230 ft.

INDIANA

Daviess County: Graham Development Co. 2 Capehart, SE SW NE 33-4n-7w. IPP 10 BOPD, Rosiclare 1,070-75 ft. TD 1,076 ft. Opens Hyatt pool.
Dubois County: H. A. Johnson 1 Miller, NE NE SE 35-1s-4w. Dry. TD 822 ft.
Olds Oil Co. 1 Hassfurther, SE NW SW 23-3s-5w. Dry. TD 1,001 ft.
Gibson County: T & H Corp. 1 Dixon, Don. 1-1n-10w. Dry. TD 2,308 ft.
Knox County: Whaley Oil Co. 1 U.S.A.-Breene, NW NE SE 21-1n-11w. Dry. TD 2,180 ft.
Perry County: Basin Drilling Co. 1 Zuelly, SW SE NW 2-5s-2w. Dry. TD 1,183 ft.
Hoyt Lovelace 1 Wheatley, NE SW SE 28-5s-3w. Dry. TD 676 ft.
Pike County: Whaler Drilling Co. 1 Tett, NE NW SE 1-2s-8w. Dry. TD 1,480 ft.
Spencer County: A. B. Doty 1 Stallings, NE NE SE 5-7s-6w. IPP 20 BOPD, Aux Vases sand 1,434-44 ft. TD 1,446 ft. Opens Lake Mills, East.
Cov Oil Co. 1 Carey, SE SW NE 1-6s-5w. Dry. TD 600 ft.
Vigo County: F. Burke 1 Dean, SW SW NW 33-10n-8w. Dry. TD 1,248 ft.

KENTUCKY

Daviess County: Shelby McIntosh 1 Shaw, NE SE SE 6-Q-31. Dry. TD 1,265 ft.
Muhlenberg County: George S. Engle 1 Ropes Bros., EL SE NW NW 10-I-29. Dry. TD 2,173 ft.



YOUR U. S. A.

The lives and fortunes of 60-odd million workers in the United States are directly influenced by how business is run—how it is managed and with its success. Businesses like individuals must be free of unnecessary restraints to growth and progress if they are to remain solvent and prosperous.

American enterprise, free and unhampered by bureaucratic interference made this country the richest on earth and its workers the most envied. Yet there are those who would change it. Only by opposing them, and every threat to our national economy and personal liberties, can we expect to hold what we have won and go forward to greater achievements. Let us be diligent to keep America free.

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Spang Boxes and Pins (stem or sinker stub ends for welding) are carefully forged from a special analysis steel that meets both the desired weldability and physical requirements. They are fully heat-treated before final machining. The result—boxes and pins at their best for weldability, strength and resistance to wear.

Pin D-330 and Box D-335 are shapes customarily furnished to repair shops having a forging hammer and fire welding equipment. Pin D-332 and Box D-337 are for the electric welding method of Stem repairs in the field.

Spang also offers Boxes and Pins with scarfed ends ready for fire welding. All are supplied to the domestic trade through authorized field repairs or service shops.

D330 D332

D335 D337

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WILDCAT COMPLETIONS

MICHIGAN

Allegan County: J. J. Patton, Trustee 1 Eddy, SW NW NE 36-3n-15w. Dry. TD 1,349 ft. in Traverse.

Eaton County: Fisher-McCall Oil & Gas, Inc. 1 Swan, NE NE NW 14-1n-4w. Dry. TD 2,065 ft. in Traverse.

Lapeer County: Brazos Oil & Gas Co. 1 Smith et ux, NE NE NE 14-7n-11e. Dry. TD 5,118 ft. in Niagaran.

MISSISSIPPI

Adams County: Ballew-Biglane-Callon 1 Armstrong, 22-5n-2w. Dry. TD 7,006 ft. Elev. 85 ft., Sparta 3,560 ft., Wilcox 4,663 ft., base Baker shale 6,391 ft.

Jett Drilling Co. and R. J. Bartlett 1-C Minter, 20-5n-1w. IP 131 BOPD, 9/64-in., 41°, Wilcox 6,684-87 ft. (casing perforations.) TD 6,999 ft. Elev. 257 ft., Vicksburg 2,436 ft., Sparta 3,507 ft., Wilcox 4,625 ft., base Baker shale 6,375 ft., Minter 6,683 ft.

Monroe County: Shell Oil Co. and W. C. Feazel 1 Gelling, 34-14s-6e. Dry. TD 5,022 ft. Elev. 346 ft., Chester 3,570 ft., Millerella 4,050 ft., Carter zone 4,166 ft., Sanders zone 4,312 ft.

ALABAMA

Clarke County: Sunnyland Contracting Co. 1 Cammack, 18-7n-4e. Dry. TD 5,204 ft. Elev. 187 ft., Chalk 2,432 ft., Eutaw 3,604 ft., marine Tuscaloosa 4,757 ft., lower Tuscaloosa 4,862 ft.

Escambia County: California Co. 1 Atkinson Oil Trust, C SE NE 27-1n-11e. Dry. TD 6,097 ft. Elev. 226 ft., Chalk 3,192 ft., Eutaw 4,673 ft., marine Tuscaloosa 5,464 ft., Massive 5,863 ft., lower Cretaceous 6,035 ft.

Clinch Drilling Co. et al 1 B. Miles est., 26-1n-7e. Dry. TD 7,004 ft. Elev. 254 ft., Chalk 3,746 ft., Eutaw sand 5,184 ft., marine Tuscaloosa 6,019 ft., lower Tuscaloosa 6,245 ft., Massive 6,448 ft., lower Cretaceous 6,638 ft.

Monroe County: H. N. Crawford et al 1 Cannon, C SW NE 36-7n-6e. Dry. TD 5,235 ft. Elev. 314 ft., Chalk 2,342 ft., Eutaw 3,720 ft., marine Tuscaloosa 4,597 ft.

GEORGIA

Walker County: T. P. Posey 1 Vernon Close, Land Lot 486, Land District 7. Junked

SOUTH LOUISIANA

Assumption Parish: Phillips Petroleum Co. 2 Rosedale, 40-14s-14e (Labadieville area). Dry. TD 14,228 ft.

Calcasieu Parish: Pan American Production Co. 1 Louisiana Sulphur Mining Co., 32-9s-11w (southwest flank Edgerly dome). Dry. TD 9,605 ft.

Iberville Parish: Kerr-McGee Oil Industries, Inc., 1 Schwing, 37-10s-10e. Dry. TD 9,426 ft.

Orleans Parish: Southwest Gas Production Co., Inc., 1 State Lease 2007. Dry. TD 10,065 ft.

St. Landry Parish: Circle Drilling Co. 1 Ariel Savoie, 46-6s-1e. Dry. TD 9,165 ft.

Plaquemines Parish: Richardson & Bass 1-F Humble-Louisiana Plaquemines Realty Co., State Lease 1212, Point a la Hache. IP 138 BOPD, 7/64-in., 39.8°, casing perforations 11,363-71 ft. TD 11,550 ft. (New pay in Point a la Hache field.)

NORTH LOUISIANA

Bienville Parish: C. M. Bagley et al 1 Lacy, C NE SW SE 23-14n-8w. Dry. TD 3,505 ft.

Caddo Parish: Southwest Gas Producing Co.-Bert Fields 1 Thigpen-Herold, 659 ft. S and 579 ft. W NEc SE 30-16n-15w. Dry. TD 6,638 ft.

Concordia Parish: H. L. Hunt and Gulf Refining Co. 20 Fisher Lumber Corp. "E," C NW SE 26-7n-7e. Dry. TD 6,000 ft. Base Nebo 4,977 ft.

Barnett Serio, Justiss-Mears 1 Clagett, 880 ft. N and 510 ft. W of SEc 18-7n-8e. Dry. TD 6,503 ft.

ARKANSAS

Miller County: Tom Palmer et al 1 Fouke estate, C SE NE NE 24-17s-28w. IPF 105 BOPD, Paluxy 4,889-93 ft., 31°, open. TD 5,097 ft. (Discovery of Boggy Creek pool.)

Monroe County: Seaboard Oil Co. "F" core test, C SW NW SW 11-2n-1w. Dry. TD 3,153 ft.

OKLAHOMA

Comanche County: Esperado Mining 1 Wilson, SW NW NW 13-2n-10w. Dry. TD 2,066 ft.

Esperado Mining 1 Dunham, NE NE NE 14-2n-10w. IPP 46 BOPD, 1,201-20 ft. 42°. TD 1,220 ft. (Oil discovery.)

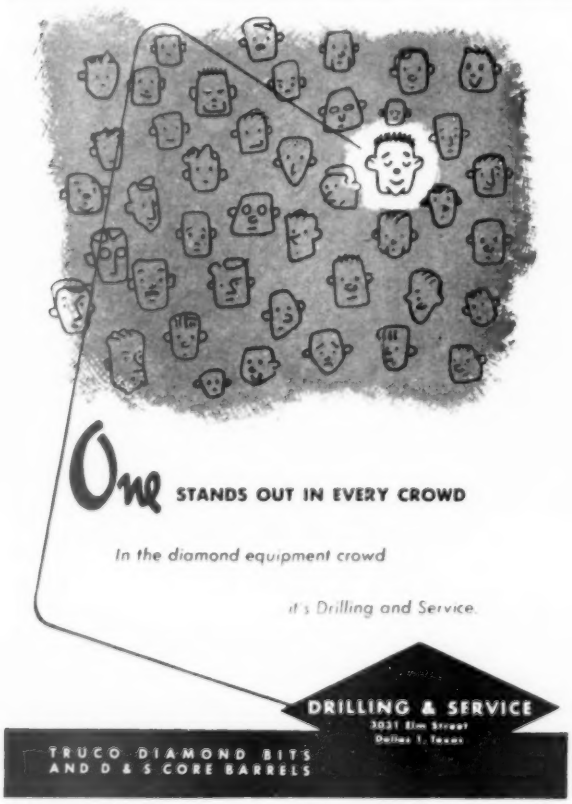
Garfield County: Champlin Refining Co. 1 Ridgway, SW SE SE 31-24n-4w. Dry. TD 6,246 ft.

Kay County: Kirkpatrick-Coon Drilling Co. 1 Ramsey, NW NW NE 12-26n-4e. Dry. TD 3,060 ft.

Walter Duncan 1 Haynes, NW NE NW 31-29n-2w. IPF 173 BOPD, Simpson 4,605-13 ft., 43.2°, 8/64-in. TD 4,613 ft. (Oil discovery.)

Kiowa County: Huffman & Malloy, Zephyr Drilling Corp. 1 Heiple, NW SE NW 6-7n-15w. IPP 24 BOPD, Springer sand 3,546-4,088 ft. TD 6,516 ft. (Oil discovery.)

Lincoln County: The Texas Co. 1 Soderstrom,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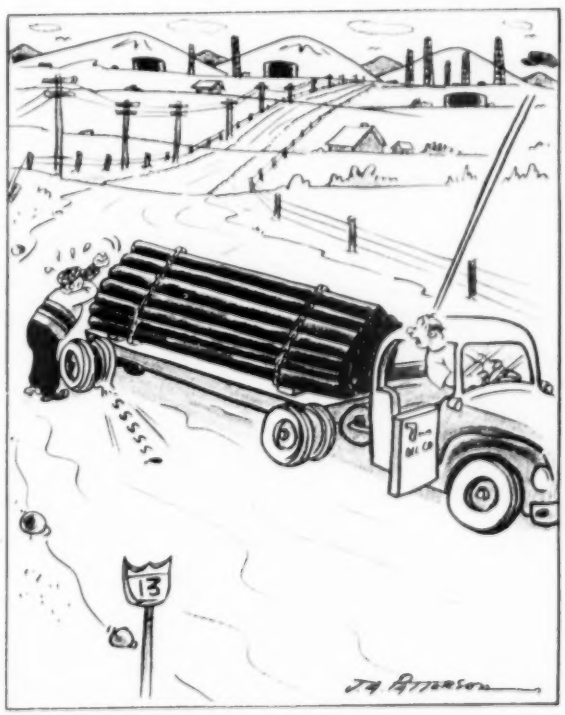

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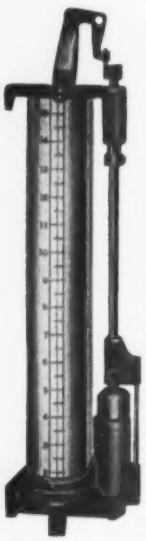
Cuts Gauging Time



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WILDCAT COMPLETIONS

SE SW SW 15-16n-4e. Dry. TD 4,675 ft.

McClain County: V. A. Brill 1 Flynn, NE NE 20-5n-4w. IPF 323 BOPD, second Bromide sand 11,122-165 ft., 320 BOPD 3rd Bromide sand 11,256-340 ft., 45 and 46°, 12/64-in. and 14/64-in. chokes. TD 12,062 ft. (Oil discovery, dual zone.)

Noble County: J. M. Henry and Goe Drilling Co. 1 Krohlke, NE NE NW 7-22n-2w. IPP 35 BOPD, Hotson 1,388-92 ft. 38°, TD 1,501 ft. (Oil discovery.)

Oklahoma County: Harper-Turner 1 Limerick, SW NW SW 4-13n-2w. Dry. TD 6,507 ft.

Harper-Turner Oil Co. 1 Tallant, SE NE SE 26-14n-2w. Dry. TD 6,225 ft.

Payne County: Russell Maguire 1 Marsh, SW SW NE 10-18n-1w. Dry. TD 5,480 ft.

Pontotoc County: Wm. H. Pine 1 Welborn, NW SW SE 6-2n-5e. Dry. TD 1,985 ft.

Pottawatomie County: K. A. Ellison 1 Winterringer, SW SE NW 20-7n-3w. Dry. TD 5,375 ft.

KANSAS

Barton County: Alpine 1 Christiansen, NW SE SE 17-20s-12w. Dry. TD 3,468 ft.

Butler County: C. H. Spoor 1 Brandt Ranch, C N½ SE 5-29s-7e. Dry. TD 2,792 ft.

Coffey County: Susmio 1 Beard, NE NE NW 14-23s-16e. IPP 20 BOPD, 955-68 ft. Squirrel sand. TD 968 ft.

Cowley County: L. C. Smitherman 1 Brooks, NW NW SE 33-32s-5e. Dry. TD 3,145 ft.

Ellis County: Heathman 1 Christer, NW NW NW 33-11s-16w. Dry. TD 3,433 ft.

Finney County: Northern Pump 2 Gardner, NE NE NW 10-23s-33w. Dry. TD 4,912 ft.

Marion County: W. R. Wilson et al 1 Sutik, C SE SW 19-18s-4e. Dry. TD 3,012 ft.

Rex & Morris et al 1 Litton, NE NW SW 27-21s-5e. Dry. TD 2,478 ft.

McPherson County: Musgrove et al 1 Stucky "B," NW NW NE 3-18s-1w. Dry. TD 2,721 ft.

Ness County: Barnett 1 Bader, SE SE SE 36-20s-22w. Dry. TD 4,381 ft.

Pratt County: El Dorado 1 Wendelberg, NE NE NE 29-25s-12w. IPP 186 BOPD, Viola 4,006-21 ft. TD 4,238 ft.

Sumner County: Alpine 1 Skibba, SE NW SE 11-35s-1e. Dry. TD 3,904 ft.

Trego County: Lewis Drilling Co. 1 Weideman, SW SW NE 16-14s-23w. Dry. TD 4,611 ft.

NEBRASKA

Gosper County: Shell Oil Co. 1 Madison, C NE NE 33-7n-23w. Dry. TD 3,139 ft. Pre-Cambrian 3,130 ft.

Kimball County: James P. Sloss 1 Ayers, NE NE NE 10-12n-53w. Dry. TD 5,855 ft.

Eddie Fisher 1 Mockett, SE SE SW 20-15n-53w. Dry. TD 5,676 ft.

NORTH DAKOTA

Bottineau County: Dakota Oil Co. 1 Schmidt, C NE NW 29-160n-77w. Dry. TD 3,892 ft. Lodgepole 3,495 ft.

Sohio Petroleum Co. 1 Artz, NE NW SW 14-163n-82w. Dry. TD 4,130 ft. Lodgepole 4,035 ft.

Ward Williston 1 State, C SW SE 36-164n-74w. Dry. TD 4,960 ft. Silurian 4,915 ft.

CALIFORNIA

Fresno County: Lebow-McNee Oil Co. 1 Brackney, 30-15s-17e. Dry. TD 7,265 ft.

Humbolt County: Elisha Walker, Jr. 1 Mohawk-Hammond, 14-1n-2e. Dry. TD 2,577 ft.

Kern County: Intex Oil Co. 85 Capital, 5-29s-27e. Dry. TD 4,392 ft.

Macson Oil Co. 1 Twissleman Comm., 16-27s-18e. Dry. TD 1,895 ft.

Pacific Western Oil Corp. 1 Hagood, 18-30s-21e. Dry. TD 4,515 ft.

Signal Oil & Gas Co. 35 Signal-U.S.L., 34-26s-18e. Dry. TD 920 ft.

Los Angeles County: Morton & Dolley et al 1 Hall, 26-5n-17w. Dry. TD 5,250 ft.

Shell Oil Co. 46-11 Bartholomae, 11-2s-9w. Dry. TD 1,564 ft.

Sacramento County: Norris Oil Co. 1 Waegell, 6-7n-7e. Dry. TD 3,036 ft.

Tulare County: C. L. Reese 1 Mavilo, 23-22s-27e. Dry. TD 794 ft.

Ventura County: General Petroleum Corp. 1 Lloyd-Butler, 12-2n-22w. Dry. TD 9,068 ft.

Yolo County: D. D. Dunlap et al 1 Natural Gas Corp.-Thomas Comm., 25-6n-3e. Dry. TD 4,502 ft.

MONTANA

Big Horn County: Tullock Creek area. Greer-Delhi 4 Kendrick, SE NE SE 8-1n-36e. Dry. TD 8,770 ft. Cambrian 8,727 ft.

North Nine Mile area. Greer-Delhi 1 Stovall, NE SE NE 32-2n-34e. Dry. TD 6,651 ft. Charles 5,995 ft.

Carbon County: Golden Dome area. Ziegler Exploration Co. 1 Shupak, NW NW NW 15-7s-22e. Dry. TD 5,039 ft. 1st. Frontier 4,600 ft.

Phillips County: Frenchman Creek. Gulf Oil Corp. 1 Government, SW SW SW 31-37n-34e. Dry. TD 6,700 ft. Cambrian 6,635 ft.

Richland County: Bororson area. Sun Oil Co.-Phillips Petroleum Co. 1 Dynneson, C SW NE 32-24n-58e. IPF 745 BOPD, 20/64-in. choke. Red River (Ordovician discovery) 12,410 ft. TD 12,671 PBTD 12,608 ft.

WYOMING

Big Horn County: South Manderson area. Ziegler Exploration 1 Horn-Government, NE SW NE 18-49n-91w. Dry. TD 5,725 ft.

Carbon County: Saratoga. Wind River Oil Co. et al 1 Saratoga-Government, NW SW SW 12-18n-85w. Dry. TD 5,225 ft. Lakota 5,200 ft.

Hot Springs County: Walker Dome. Forest Oil Corp. 1 Mill, Iron Land and Cattle Co., SE NE NE 8-48n-99w. IPP 200 BOPD, Embar discovery, new pay, Tensleep pay 6,912 ft. TD 6,965 ft.

Sublette County: Tip Top area. Mountain Fuel Supply 1 Fletcher, SW NW NE 4-27n-113w. Dry. TD 3,241 ft.

COLORADO

Adams County: East Mountain View. Triangle "J" Oil Co. 1 White, NW NE NE 21-1s-57w. IPP 35 BOPD, "J" sand discovery, new field. "J" sand 5,558 ft. TD 5,646 ft.

Sinclair Oil & Gas Co. 1 Shea, NE NE SE 14-2s-57w. Dry. TD 5,442 ft.

Fremont County: Chandler anticline. K.D. Drilling Co. 1 Gindro, NE SW SW 27-19s-70w. Dry. TD 1,321 ft. Morrison 402 ft.

Garfield County: Mendota-Greenbrier Oil Co. 1 Kelly, SW NE 29-5s-102w. Dry. TD 6,967 ft. Temp. abd. Navajo 6,876 ft.

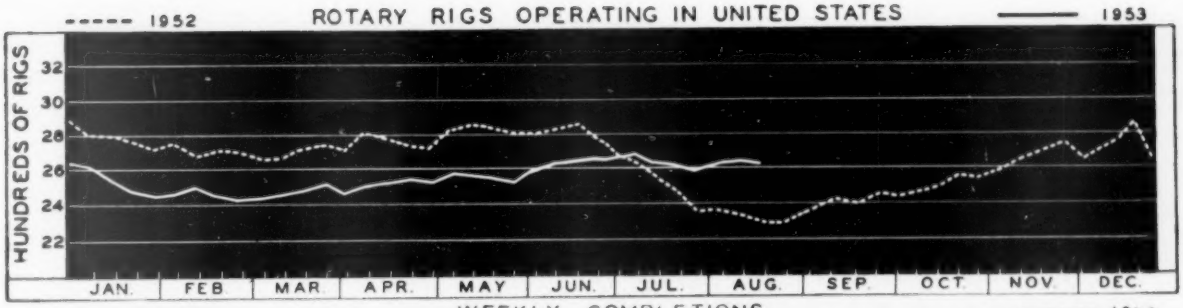
Logan County: British-American Oil Producing Co. 1 Naggatz "C," SE SW SW 19-8n-54w. Dry. TD 5,250 ft.

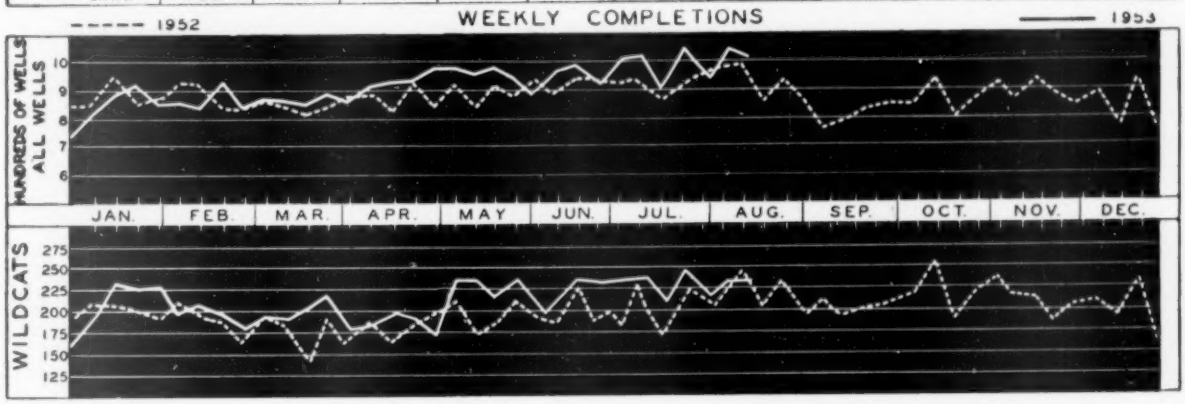
Ryan Oil Co. 2 Good, C SE SE 14-9n-54w. Dry. TD 5,274 ft.

Sunbeam Oil (Eddie Fisher) and Balderson Denver 1 State, NE NE NE 27-10n-54w. Dry. TD 5,232 ft.

Weld County: Black Hollow. The California

(Continued on page 212)





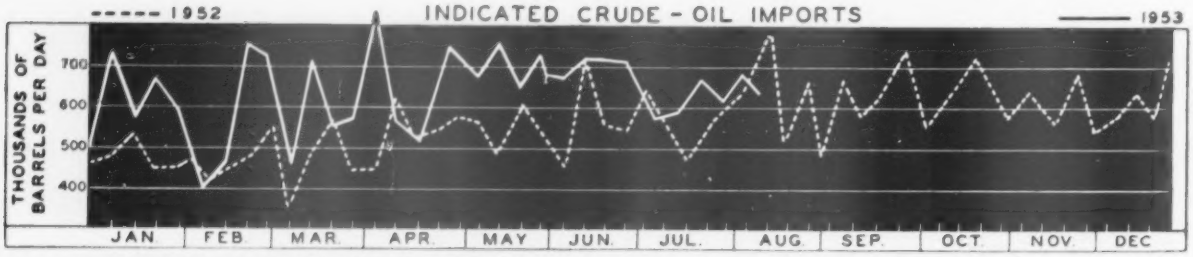
CURRENT STATISTICS

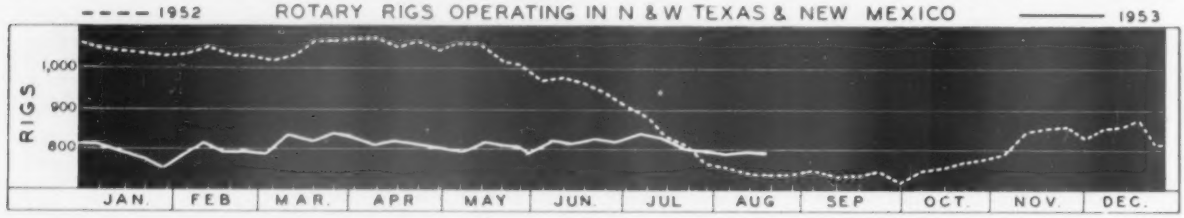
EXPLORATION

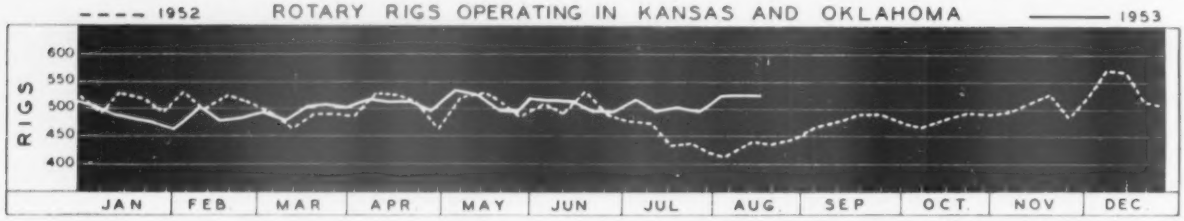
WEEKLY WELL COMPLETIONS . . .WEEK ENDED AUGUST 15, 1953

	Total of all wells					Aug. 15		Wildcat completions and discoveries					Cumulative total, 1953				
	Comp.	Oil	Gas	Dry	Footage	1953	1952	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	18	9	0	*9	27,800	448	493	0	0	0	0	0	0	0	0	0	0
Pennsylvania	47	21	5	†21	86,200	1,106	1,196	0	0	0	0	0	0	0	3	11	14
West Virginia	9	1	7	1	22,754	382	366	0	0	0	0	0	0	0	6	3	9
Ohio	21	11	2	‡8	46,334	636	643	0	0	0	0	0	2	0	1	11	14
Indiana	36	11	0	25	53,007	795	777	2	0	0	9	11	11	0	2	210	223
Kentucky	23	10	4	9	46,956	671	804	0	0	0	2	2	6	0	1	113	120
Illinois	38	20	0	18	94,239	1,158	1,222	0	0	0	9	9	4	0	0	256	260
Michigan	11	4	0	7	29,864	363	437	0	0	0	3	3	10	0	5	148	163
Kansas	104	44	10	§50	355,169	3,037	2,965	2	0	0	12	14	69	0	25	463	557
Nebraska	4	0	0	4	18,186	205	156	0	0	0	3	3	14	0	3	87	104
Oklahoma	143	85	5	§53	466,345	4,509	3,645	5	0	0	9	14	76	6	22	395	499
Texas	347	195	25	127	1,690,534	10,736	11,377	27	1	7	81	116	560	40	128	2,625	3,353
North Central (Dist. 7-B & 9)	137	82	0	55	509,254	4,038	3,656	15	0	0	37	51	293	0	13	1,070	1,376
West (Dist. 7-C & 8)	73	49	2	22	408,317	2,307	3,545	5	0	0	11	16	112	2	10	412	536
Panhandle (Dist. 10)	21	9	10	2	64,438	497	433	0	0	0	0	0	0	2	0	15	17
Eastern (Dist. 5 & 6)	14	5	1	8	86,985	502	519	0	0	0	5	5	13	2	4	172	191
Gulf Coast (Dist. 2 & 3)	49	25	7	17	334,810	1,597	1,689	2	0	4	11	17	74	15	54	412	555
Southwest (Dist. 1 & 4)	53	25	5	23	286,730	1,795	1,535	5	1	3	17	26	68	19	47	544	678
Louisiana	68	39	6	23	497,139	1,599	1,409	1	0	0	9	10	48	23	15	216	302
Northern	29	18	0	11	123,344	642	744	0	0	0	4	4	5	1	2	77	85
Southern	39	21	6	12	373,795	957	665	1	0	0	5	6	43	22	13	139	217
Arkansas	11	5	0	6	41,838	304	234	1	0	0	1	2	10	0	0	70	80
Mississippi	3	1	0	2	19,027	226	229	1	0	0	2	3	10	1	3	110	124
Southeastern States	6	1	0	5	31,614	90	42	0	0	0	5	5	1	0	0	72	73
Montana	9	5	0	4	51,332	242	165	1	0	0	4	5	7	0	0	65	72
Wyoming	12	8	1	3	63,373	416	419	1	0	0	3	4	14	0	0	74	88
Colorado	23	12	0	11	131,244	402	274	2	0	0	10	12	18	0	9	181	208
Utah	0	0	0	0	0	46	46	0	0	0	0	0	2	0	4	25	31
New Mexico	28	14	7	7	165,634	837	657	0	0	0	4	4	11	0	7	76	94
California	41	29	0	12	153,982	1,580	1,518	0	0	0	12	12	37	0	6	351	394
North Dakota	8	4	0	4	54,886	159	43	0	0	0	3	3	7	0	0	34	41
Miscellaneous (Tenn.)	1	0	0	1	1,300	37	81	0	0	0	1	1	1	0	1	29	31
Total United States	1,011	529	72	410	4,148,757	29,984	29,198	43	1	7	182	233	918	70	241	5,625	6,854
Total previous week	1,049	545	83	421	4,187,103			30	4	12	186	232	875	69	234	5,443	6,621
Total August 16, 1952	864	439	63	362	3,411,404			34	1	6	165	206	882	54	156	5,255	6,347

Service wells included: *9, †18, ‡2, §1.



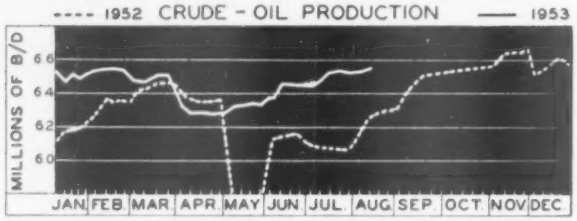


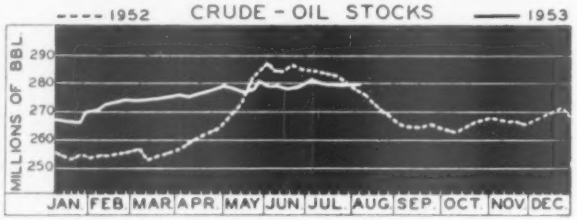


DAILY AVERAGE PRODUCTION FOR WEEK

	August 15			Aug. 8
	Crude oil	Lease condensate	Total	total
Alabama	5,100		5,100	5,100
Arkansas	77,550	450	78,000	76,600
California	1,010,100		1,010,100	1,010,100
Colorado	108,900		108,900	109,000
Eastern	59,200		59,200	59,200
Florida	1,550		1,550	1,550
Illinois	161,100		161,100	161,300
Indiana	35,600		35,600	35,300
Kansas	320,300		320,300	308,900
Kentucky	31,300		31,300	30,800
Louisiana	663,475	32,800	696,275	694,675
North	107,300	2,800	110,100	108,500
South	556,175	30,000	586,175	586,175
Michigan	32,500		32,500	32,300
Mississippi	93,400	3,400	96,800	96,350
Montana	31,800		31,800	31,800
Nebraska	17,200		17,200	16,100
New Mexico	199,200	750	199,950	200,050
Oklahoma	552,200		552,200	550,300
Texas	2,840,725	43,850	2,884,575	2,884,575
Dist. 1	39,675	350	40,025	40,025
Dist. 2	157,475	5,700	163,175	163,175
Dist. 3	454,100	22,000	476,100	476,100
Dist. 4	270,900	5,800	276,700	276,700
Dist. 5	49,750	350	50,100	50,100
Dist. 6	128,700	4,900	133,600	133,600
East Texas field	246,600		246,600	246,600
Dist. 7-B	120,625	50	120,675	120,675
Dist. 7-C	173,350	3,800	177,150	177,150
Dist. 8	934,275	500	934,775	934,775
Dist. 9	188,775	350	189,125	189,125
Dist. 10	76,500	50	76,550	76,550
Utah	5,900		5,900	5,800
Wyoming	212,000		212,000	212,500
North Dakota	14,000		14,000	14,000
Total U. S.	6,473,100	81,250	6,554,350	6,536,300
Change from previous week, up			18,050	
Canada	282,900		282,900	228,600
Total U. S. production January 1-August 15			1,463,303,350 bbl.	
Same period last year (crude plus cond.)			*1,394,475,675 bbl.	

*Includes 20,016,885 bbl. condensate.



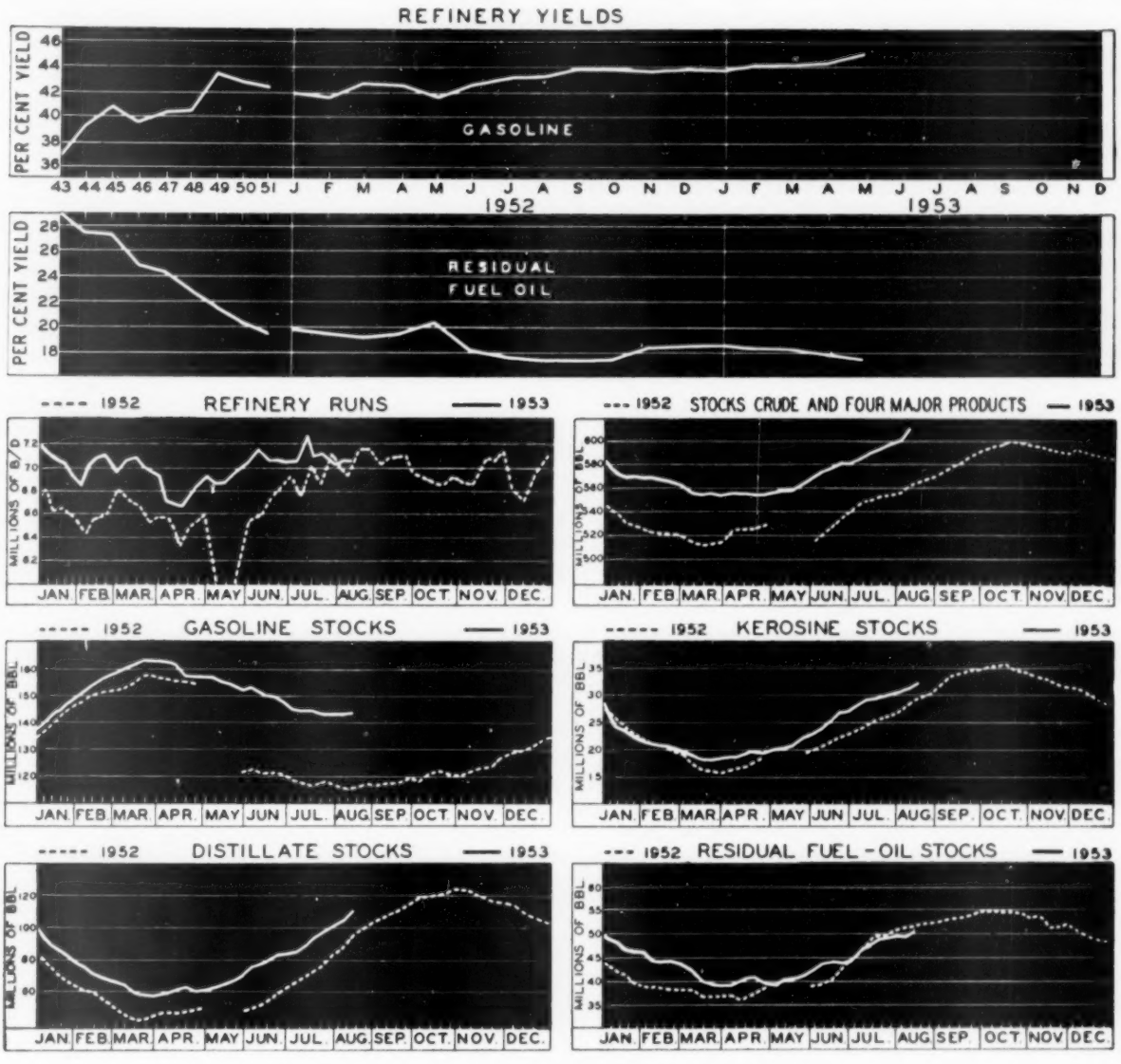


CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	Aug. 8, '53	Aug. 1, '53	Aug. 9, '52
Pennsylvania Grade	2,677	2,712	2,336
Other Appalachian	2,230	2,217	2,083
Illinois, Indiana, Michigan	12,382	12,427	12,997
Arkansas	2,984	2,822	3,048
Louisiana	16,296	15,391	15,588
North	2,827	2,373	2,533
Gulf	13,469	13,018	13,055
Mississippi	3,412	3,381	3,767
New Mexico	7,667	7,674	7,513
Oklahoma and Kansas	38,660	38,110	40,213
Texas	132,872	133,250	131,856
East Texas	11,050	11,453	12,824
West Texas	59,422	60,113	57,965
Texas Gulf	27,779	26,850	28,389
Other Texas	34,621	34,834	32,678
Rocky Mountain	16,985	17,183	15,443
California	33,284	33,684	31,715
Foreign	†10,162	10,293	9,099
Total	279,611	279,144	275,658

*Bureau of Mines. †Includes 2,735,000 bbl. in California.

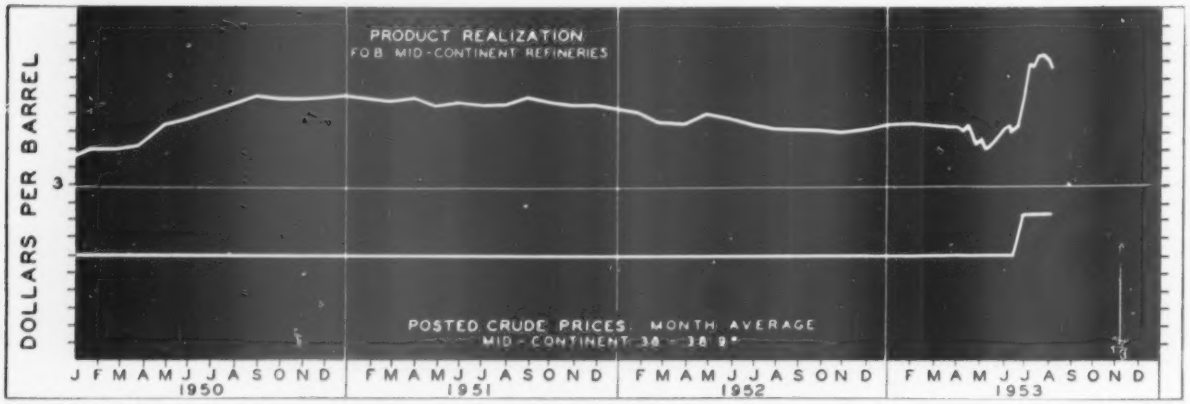

REFINERY YIELDS
PER CENT YIELD
GASOLINE
43 44 45 46 47 48 49 50 51 J F M A M J J A S O N D J F M A M J J A S O N D
1952
1953
PER CENT YIELD
RESIDUAL FUEL OIL
---- 1952 REFINERY RUNS —— 1953
MILLIONS OF B/D
--- 1952 STOCKS CRUDE AND FOUR MAJOR PRODUCTS — 1953
MILLIONS OF BBL
----- 1952 GASOLINE STOCKS —— 1953
MILLIONS OF BBL
----- 1952 KEROSINE STOCKS —— 1953
MILLIONS OF BBL
----- 1952 DISTILLATE STOCKS —— 1953
MILLIONS OF BBL
--- 1952 RESIDUAL FUEL-OIL STOCKS — 1953
MILLIONS OF BBL
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

A.P.I. REFINERY REPORT, AUGUST 15

(Thousands of barrels)

District—	Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.	Stocks‡—Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, August 1952—Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.
East Coast	1,063	445.1	32.0	253.0	223.0	34,294	13,162	37,958	12,773	1,062	428.9	48.0	239.5	225.2
Appalachian:														
District 1	103	41.7	6.4	21.3	14.1	3,389	574	1,304	762	105	42.3	5.0	14.0	9.3
District 2	94	57.2	9.0	9.0	11.3	1,559	480	517	133	76	41.7	1.7	15.4	14.2
Ind., Ill., Ky.	1,314	735.6	72.0	244.0	174.6	28,343	7,867	19,639	4,484	1,350	708.6	78.5	247.7	167.5
Okla., Kans., Mo.	618	353.1	20.9	129.9	55.9	15,075	2,314	12,022	1,211	610	342.7	16.0	143.7	60.3
Inland Texas	284	191.9	9.8	60.0	49.0	5,563	594	2,028	1,659	258	172.4	12.3	45.1	36.4
Texas Gulf Coast	1,688	885.3	103.0	411.0	237.4	18,934	3,776	14,661	7,221	1,738	781.3	139.4	442.0	282.0
La. Gulf Coast	537	300.7	41.1	132.6	58.6	7,726	2,742	7,027	1,817	527	248.4	55.7	141.1	56.2
N. La. and Ark.	84	34.0	7.6	18.0	7.4	3,166	567	748	142	86	34.0	6.5	21.4	6.1
Rocky Mountain:														
New Mexico	20	12.9		2.8	3.9	192		36	30	19	12.1	0.2	2.9	3.9
Other Rocky Mtn.	261	127.1	1.7	59.1	47.1	5,253	257	2,529	976	243	113.3	5.3	45.9	41.9
California	1,026	467.0	4.6	128.0	351.3	20,083	402	12,858	19,025	1,044	451.1	6.2	155.3	349.3
Aug. 15, 1953	7,092	3,651.6	308.1	1,468.7	1,233.6	143,577	32,735	110,727	50,233	7,118	3,376.8	374.8	1,514.0	1,252.3
Aug. 8, 1953	7,063	3,496.7	313.7	1,392.0	1,225.1	143,319	31,681	106,710	49,488					
Aug. 16, 1952	7,177	3,304.0	379.6	1,477.4	1,245.7	115,979	29,721	95,280	51,959					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952
F M A M J J A S O N D
1953

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.67 for week ended August 8, $3.71 for previous week, and $3.33 for August 1952. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of August 19, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	11.25-11.625	13-13.8	11.25-11.75
Premium gasoline	12.375-12.875	14.5-14.8	12.5-12.75
42-44 w.w. kerosine	8.875-9.25	10.15-10.4	9-9.5
No. 2 straw fuel oil	7.875-8.25	8.9-9.4	8-8.5
No. 6 residual	$1.10-1.25	$2.15-2.40	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5.75	5.25	5.5
Grade 18-55	6.90	6.40	6.65

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13.75
750 vis., No. 3-4 neutral	16.75
2,000 No. 5-6 neutral	18-18.75

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	20.5-21.5
200 vis, No. 3 neutral, 0-10 pp.	14.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	25.5
180 vis., 10 p.t. neutral	27.5

WAX

Mid-Continent

132-134 A.M.P.	6.0

IN an unusual mid-August market situation, No. 6 fuel oil last week was reported tight in the Mid-Continent and other areas, with particularly strong demand noted for product with a sulfur content below 0.75 per cent.

Demand also was reported good for No. 5 fuel oil. Strong demand for these products this early suggested the possibility of a softer market for both No. 5 and 6 in September and October. Brisk demand for these oils was credited to extremely early buying, with the accompanying possibility that heavier-than-normal buying now might have the effect of reducing demand at a time when it normally is picking up.

Gasoline was in ample supply throughout the nation, and some market observers again were suggesting that refinery runs are being kept too high.

Gasoline stocks rose more than 150,000 bbl. during the week ended August 15, the American Petroleum Institute reported, leading some to comment that the petroleum industry now appears able to supply peak gasoline demands out of current production.

In spite of the supply picture, there was no hint of a break in prices during the remainder of the gasoline season, although most suppliers agreed that a firming is not now expected.

A continuing increase in stocks of distillate fuels pointed to an ample supply of heating oils this winter. Movement to secondary storage, however, still is only a trickle, even though current offerings on the East Coast have been at prices lower than those asked before the crude-oil price increase of June. Whether the price might slip between now and the end of September appeared to be the question causing jobbers to delay buying. With this situation, an immediate firming of distillate prices appeared out of the question.

CRUDE PRICES GRAVITY SCHEDULE

	Signal Hill, Calif.*	Oklahoma, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87	.....	.....	.....
15-15.9	1.93	.....	.....	.....
16-16.9	1.99	.....	.....	.....
17-17.9	2.05	.....	.....	.....
18-18.9	2.11	.....	.....	.....
19-19.9	2.18	.....	.....	.....
20-20.9	2.24	$2.50	.....	$2.37
21-21.9	2.30	2.52	.....	2.39
22-22.9	2.37	2.54	.....	2.41
23-23.9	2.45	2.56	.....	2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9	.....	2.76	3.09	2.63
34-34.9	.....	2.78	3.11	2.65
35-35.9	.....	2.80	3.13	2.67
36-36.9	.....	2.82	3.15	2.69
37-37.9	.....	2.84	3.17	2.71
38-38.9	.....	2.86	3.19	2.73
39-39.9	.....	2.88	3.21	2.75
40 and above	.....	2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast. ‡Includes New Mexico Permian.

Prices East of California effective June 15, 1953. California prices effective February 16, 1953. Pennsylvania Grade prices effective August 1, 1953.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	4.55
Southwest Pennsylvania	4.11
West Virginia	4.05
Ohio	4.04
Illinois Basin	3.02

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JOY 300 Drilling Rig butane powered, mounted on Brockaway 6x6 truck, 3500 feet 3½ inch drill pipe. Auxiliary mud pump and butane engine as separate unit. All tools and equipment included. This rig in first-class working condition and ready to go to work immediately. Call or write Steele Brothers, Crete, Nebraska. Phone 127.

4,000′ NEW NATIONAL 3½″ drill pipe—make offer. 7,000′ used tuboscoped grade 2 4½″ drill pipe—make offer. 16—6¼″ drill collars, guaranteed perfect—make offer. 2—7¼″ drill collars, as above—make offer. 1 WAK Waukesha, skid mounted, new torque converter—$2,500, will consider less for cash. 7P Wilson-Snyder pump, completely overhauled, guaranteed, $5,000. 1949 White "28" truck, with tandem float, winch. Just overhauled, new tires complete. $5,000. SW&H Drilling Company, Box 664, Midland, Texas. Phone 22111.

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We have been taking up several miles of our oil and gas lines in this district and have for sale considerable very good used pipe, as listed below:
2,500′ 6⅝″ o.d. bevelled. Good.
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Paola, Kansas

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BETHLEHEM TWISTER

Both Rigs Have
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FOR SALE: 42 miles NEW 6⅝″ 17.02 lb. .250″ wall Kaiser Electric Weld Line Pipe, API-5L-Grade B, f.o.b. Denver at mill price $1.45 foot. Stored in Denver in transit. Available today. Reason—changing our Good-All 40 mile pipe line from 6″ to 8″. Phone 880. Good-All Elec. Mfg. Co., Ogallala, Nebraska.

FOR SALE: TUBING TOOL JOINTS, 197 sets, slightly used, Gulf Tool Company, Model A-200, double-box type, for use with 2″ EUE 8rd. thd. API tubing. Slick-Urschel Oil Company, 2000 Milam Building, San Antonio, Texas. Phone: Fannin 5371.

IN GOOD CONDITION, JUMBO FORT WORTH SPUDDER, 185 HP Motor, Tools complete from 15″ down. Practically new wire lines. Priced to sell. Contact Mrs. H. C. Knox, Tele. 547, Graham, Texas.

HEAVY CABLE TOOL RIG. Moore galvanized 80′ K derrick, heavy wheels, 6 sheave crown block, O C S Greyhound 10,000′ chain driven sand reel. Complete with Waukesha heavy duty drilling unit. New condition. Located South Western Pennsylvania. Box G-635, The Oil and Gas Journal, Tulsa, Okla.

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H. H. COFFIELD
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Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

FOR SALE
New and Used material—Immediate delivery from stock, Angles, Channels, I and WF Beams, especially for construction needs.
H BEAMS **PILE SECTIONS**
Phone or Wire your steel requirements.
We are also interested in purchasing your surplus material. We assure you our prices will be the best obtainable.
CARSAND STEEL CORP.
14-23 34th Avenue
Astoria, New York
Astoria 8-4484 8-8023

EQUIPMENT FOR SALE

EVERYTHING in new and used equipment for well drilling. Fishing tools rented. Save money, get quotations from Pressey & Son, Pueblo, Colorado.

FOR SALE: 7500′ 4½″ 16.60# Sonoscoped Drill Pipe 4500′ 3½″ 13.30# Reg. Drill Pipe. 1—6″ x 41′ Square Kelly, Rotary, Cable Tool and production equipment. Giffin & Thompson Supply, Hoisington, Kansas. Phone 477.

ONE 28L Bucyrus Erie Spudder equipped with tools for top to bottom hole drilling and B L Diesel engine. Call or write Juan Petroleum Co., Box 693, Grayville, Ill., or call Phone 5404, Grayville, Ill.

FOR SALE: 1 Failing 1500 heavy duty drill with 4½ x 6 Gardner-Denver pump mounted on 1947 K7 International truck, equipped for propane. A-1 condition. $7000.00. Includes 800 ft. 2⅜ Failing exploration drill pipe. Lewis & Clemens Drilling Co., Box 101, Princeton, Indiana.

FOR SALE: 10,000′ of 9″ OD 40# and 46.10# used seamless steel J-55 casing at Oklahoma City warehouse. Cities Service Oil, Patridge, Bartlesville, Okla.

FOR SALE: Bucyrus-Erie 28L Spudder 1949 Model. Trailer Mounted, 3 strings new tools and cables, located Central Pennsylvania. Richard G. Kohl, R. D. 3, Harrisburg, Pa.

7¼″ x 14″ FXZ Gardner-Denver Pump and NKU Waukesha Unitized; 5—6½″ x 2¼″ x-30′ Drill Collars; 16 KW Gasoline Motor Driven Generator Set; Water Tanks; Tool House; Tool Box; Thompson Shaker; Miscellaneous Subs; Tools, etc.; 12103 G.M. Twin Diesel Engine; V-12 and V-8 LeRoi; 140 GKU Waukesha; Wilson Giant Double Drum Complete with EKU Waukesha. Many other items of rotary equipment all in A-1 condition available. Write or call Empire Machinery Company, Box 4026, Odessa, Texas, or 1613 Tower Petroleum Building, Dallas, Texas.

Large Diameter
NEW STEEL PIPE

8⅝″	O.D.	.250 wall	1250 feet
8⅝″	O.D.	.352 wall	1080 feet
9⅝″	O.D.	.395 wall	800 feet
14″	O.D.	.250 wall	400 feet
24″	O.D.	.281 wall	4500 feet
24″	O.D.	.406 wall	1500 feet
26″	O.D.	.281 wall	2400 feet
28″	O.D.	.281 wall	1500 feet
30″	O.D.	.500 wall	3000 feet

All 40 foot lengths
Small size pipe and tubing also available
Attractively Priced
for Immediate Shipment

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-964)
Kansas City 18, Kansas
ATwater 9305

EQUIPMENT FOR SALE

7–8000 GAL. R.R. TANK CAR tanks with heating coils in New Jersey $685 each. Lestan Corp., Rosemont, Pa.

FOR SALE: Three truck mounted tubing and rod pulling and swabbing units, Models "K" and "H" Cardwells and 1050 Ideco. Good condition with new wire and accessories. Write Suite 114, Fidelity Union Life Bldg., Midland, Texas, if interested or Phone 2-5769, Midland.

FOR SALE: We have several miles of good used 2", 3", 4" and 6" line pipe in Kansas and Oklahoma. Prices and inventory upon request. Cities Service Oil, Patridge, Bartlesville, Okla.

SULLIVAN 200, trailer mounted, complete with all tools, contact for inventory and price. Mesker Drilling Company, Box 6157, Tulsa, Phone 5-9357.

WELDED TANKS FOR SALE

One 55,000 bbl. tank and one 20,000 bbl. tank. These tanks are complete with all fittings, vents and walk ways. Erected by Wyatts of Houston, made of heavy steel with ½" plate in bottom three rings of both tanks making them suitable for oil or molasses. Located at Continental Pipe Line Company Jackson Station Rio Grande Valley. Price Where-is As-is. Not knocked down. $16,000.00 for the 55,000 bbl. tank and $8,000.00 for the 20,000 bbl. tank or $22,000.00 for both. Contact Sam Krasner, 314 Wilson Tower, Corpus Christi, Texas, or phone 3-9365 for further information.

CARDWELL MODEL L with air clutches, 87 ft. double pole 8 x 10 mast. 145 GKU engine, air tongs, light plant. New Brewster block and hook. All mounted on trailer. Ready for immediate delivery. Box G-625, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 1951 Cessna 195; 245 HP; 400 total hours; Cross-wind Gear; VHF; OMNI; Gyros; Hangared; Brand new condition; one owner; $10,000.00; write Box G-582, The Oil and Gas Journal, Tulsa, Oklahoma.

WILSON SENIOR, double drum, mounted on GMC 6 x 6 truck, 7 x 8 62 ft. mast. Immediate delivery. Box G-624, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

NOTICE: We buy. We sell equipment everywhere. If you want to sell or buy, contact Pressey & Son, Pueblo, Colorado.

WANTED: Good used 2½" to 4" motor driven pipe threading machine, also need 1" to 2" machine. Prices must be reasonable. W. H. Ellis, P.O. Box 73, Loveladeville, Ky.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale? Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.
The Oil and Gas Journal.

HELP WANTED

PROCESS Engineer wanted for Mid-Continent refinery. Excellent opportunities for advancement with growing company. Prefer Chemical Engineering graduate with approximately 5 years plant experience. Box G-636, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.

HELP WANTED

WANTED: Petroleum or Mechanical Engineers for oil tool design. Field experience desirable. State age, education, experience and salary expected. Box G-556, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEERS—Expanding chemical and fracturing service firm requires petroleum engineers under 30 for development and sales work. Limited experience acceptable. Firm is one of oldest in the business operating in Texas, Oklahoma, Louisiana, New Mexico and Kansas. Box G-652, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEERS

FOREIGN SERVICE

Graduate engineers with good background in general physics, mathematics, mechanics and with some laboratory experience in equipment and techniques. For laboratory position responsible for theoretical experimental studies on reservoir fluid and rocks. Duties will consist of designing equipment, performing or supervising, testing and analyzing and reporting results. Studies pertinent to evaluation of primary depletion practices and applicability of secondary recovery for pressure maintenance operation will be required.

Please write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OG-5
Arabian-American
Oil Company
505 Park Avenue
New York 22, N. Y.

PARTY CHIEFS AND COMPUTERS

Established contracting company has limited number of openings with good future for well qualified interpretative personnel. Give all details of education and experience in reply.

Box G-615, The Oil and Gas Journal
Tulsa, Oklahoma

Refinery
Mechanical
Engineers
SOUTH AMERICA

A major oil company affiliated with Standard Oil Company (N.J.) needs graduate engineers with several years' refinery experience. Must be qualified to design refinery process equipment, develop and coordinate engineering projects, and/or inspect refinery equipment.

Write giving age, marital status, education, and full details of experience.

Box 308-M
Radio City Station
New York 19, N. Y.

HELP WANTED

DISTRICT GEOLOGIST. Medium size San Antonio independent operator desires geologist with considerable South Texas subsurface experience. Must be capable of directing office and having knowledge of all phases of petroleum exploration in the area. State age, education, experience, and salary. Box G-630, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPANDING PROGRAM provides excellent opportunity for a few experienced Seismic Party Chiefs for foreign and domestic assignments. Applicants should have not less than three years experience in capacity of Party Chief, be proficient in interpretation and have proven ability to administer crew. Liberal compensation based upon competence. Reply Box G-628, The Oil and Gas Journal, Tulsa, Oklahoma.

INDEPENDENT COMPANY DESIRES Geologists—Geophysicists—Computers to be based in Oklahoma City. Qualified men who wish to advance themselves. Telephone Victor 3-1362 or write K. L. Spire, 7624 N. May Avenue, Oklahoma City, Oklahoma.

SALES ENGINEER: Aggressive, experienced sales engineer to contact petroleum engineers, equipment engineers and purchasing agents on a line of specialty oil field equipment. Acquaintance with Houston, Dallas and Fort Worth personnel desirable. Exceptionally attractive proposition for the right man. Address reply to P.O. Box 2576, Dallas 1, Texas.

EXPERIENCED Seismologists and Seismic Computers by large geophysical contracting company with long record of sound expansion. Excellent opportunities for men seeking achievement possibilities. Give full details of education and experience in letter. Reply to Box G-627, The Oil and Gas Journal, Tulsa, Oklahoma.

SUBSURFACE GEOLOGIST

With degree in Geology and a minimum of 3 years' subsurface experience on deep wells. To work in Saudi Arabia on deep wells making lithologic and faunal logs from cores and cuttings, interpreting electrical logs and working on field and regional stratigraphic studies. Salary commensurate with experience and qualifications.

Write giving personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OGJ
Arabian-American
Oil Company
505 Park Avenue
New York 22, N. Y.

RESERVOIR ENGINEER

A large unit operation desires to hire an engineer with minimum of three years of experience in all aspects of reservoir engineering. Applicants should state education and experience in letter of inquiry. Box G-656, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

MICROPALEONTOLOGIST

Preferably with an advanced degree and a minimum of 5 years' commercial or academic experience. To work in the New York research laboratory of a major oil company. This position demands broad interests in Stratigraphy and Biofacies and the capacity to do independent work on projects assigned. Salary dependent on experience and qualifications.

Write giving personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OGJ

Arabian - American Oil Company

505 Park Avenue

New York 22, N. Y.

WANTED: Engineers with petroleum refinery construction experience. Several positions open to qualified engineers for field service in construction and for supervision of contractor's work. Applicants must be willing to travel. All applications strictly confidential. Please send complete resume giving age, education, experience and salary desired to: Personnel Director, Universal Oil Products Company, 30 Algonquin Road, Des Plaines, Illinois.

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

SALESMEN WANTED: For WIPING RAGS as additional line—must have good contacts with oil companies—traveling Kansas, Oklahoma, and Texas—good income. Box G-653, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

ESTIMATORS

Young engineers capable of mechanical estimating for construction of refineries, steam power and similar industrial projects. Must have some field experience. Considerable weight given to ambition, intelligence and interest in estimating and cost analysis.

BECHTEL CORPORATION

220 Bush Street
San Francisco, California

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628, Ph. No. 3-3141, Hobbs, New Mexico.

REFINERY manager, 15 years practical experience, engineering background, economy minded, progressive, M.S. degree, salary $800. Write Box G-599, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING Superintendent. 3 years, 5 rigs for contractor. 17 years oilfield experience along Gulf Coast. 41 years old and absolutely sober. Experience in all phases of contract drilling. Desiring a change or would like an interest in 1 or more rigs or what have you. Reply Box G-638, The Oil and Gas Journal, Tulsa, Oklahoma.

TECHNICAL SALES ENGINEER: College graduate qualified experience to sell equipment, materials applicable refineries, gasoline plants, petrochemical, product pipeline, gas transmission. Oklahoma, Kansas, Panhandle Texas. Box G-645, The Oil and Gas Journal, Tulsa, Oklahoma.

OFFICE Manager, Accountant, Executive Assistant. College Graduate, 27, 5 years with major in Production, Accounting and personnel, 3½ years supervisory. Box G-654, The Oil and Gas Journal, Tulsa, Oklahoma.

DISTRICT GEOLOGIST with major company, 10 years experience Oklahoma, West Texas. Wants responsible job in Denver with smaller company or independent. Box G-657, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, 14 years experience all phases petroleum geology (lease evaluation, appraisal, exploration and development). Regional and Detail subsurface experience in Gulf Coast, Mid-Continent, West Texas, Rocky Mountain and Foreign Areas. Some administrative duties desirable. Location open. Box G-650, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST: 29, German doctor's degree, 3 years petroleum exploration, mainly seismic, some gravity, desires position in Canada with oil or mining company. Box G-649, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 34 years old, married, 2 children, 11 years experience in geological and land work. Experienced to capably appraise, assemble, evaluate and direct all phases of exploration and development programs. Desires permanent and secure position with independent company. Location immaterial. Box 2034, Midland, Texas.

MANUFACTURERS AGENT, interested in production and drilling equipment accounts. Territory consisting of South Louisiana and Mississippi. Warehousing space available. Headquarters Harvey, La. Write Box 102, Harvey, Louisiana.

SENIOR EQUIPMENT INSPECTOR: Graduate engineer, 12 years supervisory position inspecting petroleum equipment, power plants, refrigeration, etc., prefers continued foreign employment. Thorough knowledge ASME, API-ASME, ASA and related codes. Single, age 45. Box G-648, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, 36, married. Nine years experience. Capable of supervising production, completions, workovers, repressure and water-flood problems. Desires responsible position with aggressive independent. Box G-647, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, 27, married, M.S., 4 years graduate training, research in foraminifera, fusulinids, stratigraphy; desires position preferably Gulf Coast or West. Box G-658, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column? Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

ROYALTIES

WORLD'S LARGEST REGION for gas-oil condensate reserves and expectant oil fields, inquire for opportunities therein, A. S. Berry, P. O. Box 1383, Tulsa, Oklahoma.

PRODUCING ROYALTY and overrides for sale. Wire-write-call for particulars JACK EAGLE, 706 City Natl. Bldg., Okla City, Okla. REgent 6-7027.

ROYALTY for sale or lease. All or part of quarter section between Hobbs and Lovington. Claude F. Wright, Garden City, Kansas, or J. L. Coleman, Box 813, Hobbs, New Mexico.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

REAL ESTATE

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

MAILING LISTS

MAILING LISTS of the oil industry. Our 30th year. Send for catalogue. Oil Industry Mailing List Co., 405 Tuloma Bldg., Tulsa, Okla.

ELECTRICAL CONTRACTORS

Office Phone	Res. Phone
5-5315	7-4950

W. L. RATCLIFF COMPANY
ELECTRICAL CONTRACTORS
Industrial—Commercial—Distribution

W. L. Ratcliff	506 Caddo St.
P. O. Box 373	Shreveport, La.

SERVICES

PETROLEUM CONSULTING

Service expanding into Southwest Texas, Districts 1 and 4, will accept up to three retainers on annual basis. Invaluable engineering and geological data available to clients in this prolific oil area. Box G-655, The Oil and Gas Journal, Tulsa, Oklahoma.

FINANCING

YOUR FINANCING PROBLEM can most probably be solved. Inquiries invited. Address: Box G-617, The Oil and Gas Journal, Tulsa, Oklahoma.

GAS FINANCING

We finance the installation of gathering systems, compressor stations, processing plants, etc., and purchase casinghead and natural gas.

Well owners are paid for their gas and also participate in operations. Reply in confidence to

Box G-651

The Oil and Gas Journal

Tulsa, Oklahoma

BUSINESS OPPORTUNITIES

PETROCHEMICAL MANUFACTURER—We have successfully introduced a series of synthetic petrochemical resins and are now faced with demand in excess of existing facilities in East. Ideal location for new plant in Texas-Oklahoma area close to raw materials. Present owners are reluctant to relocate and offer all or part of their stock to substantial parties interested in petrochemical manufacturing. No process water required. Principals only. Box G-659, The Oil and Gas Journal, Tulsa, Oklahoma.

NOTICE TO BIDDERS

Notice is hereby given to whom concerned, that in compliance with the provisions of House Bill No. 148, enacted by the 53rd Legislature, notice is hereby given that on Tuesday, September 8, 1953, at 10:00 A.M., the State Board of Water Engineers, 302 West 15th Street, Austin, Texas, will publicly open bids for the performance of work hereinafter described, to-wit: The plugging of five (5) abandoned oil wells in the bed of, and immediately adjacent to the Frio River in McMullen County, Texas, in the Calliham Oil Field located about one (1) mile north of Calliham, Texas. Location maps, specifications and contract forms may be obtained either by letter or in person from the above named offices. Given under and by virtue of an order of the Board of Water Engineers for the State of Texas, at the office of the said Board at Austin, Texas, this the 13th day of August, 1953. H. A. Beckwith, A. P. Rollins, James S. Guleke, Board of Water Engineers.

LEASE AND DRILLING BLOCKS

80,000 ACRES Tennessee mineral-timber land. $3.50 acre. All mineral rights. Details, E. Jester, 12744 Vanowen, North Hollywood, Calif.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

SEE A. L. Bowles, Rollow Building, Ada, Oklahoma, for drilling deals.

WANTED: Settled production approx. 1,000 bbl. daily, with additional acreage on which wells can be drilled. Stauffer, 108½ E. Grand River, Howell, Michigan.

MAKE ME A DEAL TO DRILL—Have 16,000 Acres under lease in Rawlins County, Kansas. Will Farm Out Part on Drilling Deals. F. W. Vishnefske, Salina, Kansas.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

NEW OILFIELDS—SE NEW MEXICO

Large production established. General area under accelerated development. Other important fields ready to drill. Data on request.

W. J. PETERMAN, Geologist
1918-1953
Portales **New Mexico**

LEASES ROYALTIES

Producing and Nonproducing

Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY

6635 Delmar Ave., St. Louis 5, Mo.

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GOVERNMENT AERIAL PHOTOGRAPHY

Our integrated services of personal search reporting, prepaid orders, and delivery follow-up often save you a month's costly delay in difficult, unsatisfactory correspondence with numerous gov't agencies on procurement of inexpensive stereo prints, mosaics, etc. U.S. air coverage divided among various agencies each operating separately. Fees quoted on your job based on work required. Original gov't. prepayment receipts furnished, prints shipped direct. Searches for ready made foreign air photography also made. for exploration, etc. **Write Dept. OGJ.**

WASHINGTON COMMERCIAL CO.
1200 15th St. N.W., Washington 5, D.C.

Equipment Men
. . . in the News

Lutz Is Promoted to General Field Manager

K. V. LUTZ

Kenneth V. Lutz, of St. Louis, has been appointed general field manager of All-State Welding Alloys Co., Inc. Announcement of this promotion was made by Bent Laune, president, at the company's offices in White Plains, N. Y.

Lutz will be responsible for field supervision of sales and service to users and distributors of All-State alloys and fluxes, and also for the establishment of additional such facilities when needed.

Since joining All-State in 1948, and until recently, Lutz has been regional manager for 11 western states and Hawaii. In the past 5 years he has conducted some 170 All-State clinics and 1,600 plant demonstrations.

Junker Is Named to New Manager's Post by Goodyear

R. M. Junker has been appointed manager of the newly combined departments of tank lining and industrial roll sales in Goodyear Tire & Rubber Co.'s industrial products division.

Junker joined the company in 1942 and was assigned to the efficiency department, later doing wage analysis. He was named to Goodyear's tank lining sales staff in 1946, and was appointed manager of industrial roll sales in 1948.

J. B. Beaird Makes Russell Manager, Machining Division

Carlyle E. Russell has been appointed manager of the machining division of The J. B. Beaird Co., Inc., Shreveport, according to an announcement from C. N. Wibker, vice president and works manager. Russell will have supervision over ordnance shell production and the machining and maintenace departments at Beaird.

Russell was formerly assistant general manager of Turner Brass Works in Sycamore, Ill., for 3 years, where he was in charge of all production, estimating and tooling. Prior to that he held various positions in production departments of midwestern manufacturing companies.

WILDCAT COMPLETIONS

(Continued from page 204)

Co. 1 Baiamonte, SE NE NW 6-7n-66w. IPP 304 BOPD, Lyons sand 8,917 ft. TD 8,940 ft. (Lyons discovery, new field.)

William R. Whittaker Co. 1 Klausner, C NE SW 34-1n-62w. Dry. TD 8,413 ft. Lyons sand 8,364 ft.

Buckingham Valley, Eisenhower Drilling Co. 2 Allen, C SE SE 10-7n-59w. Dry. TD 6,793 ft.

Herndon Drilling Co. 1 Kiesel, SW SE SW 32-8n-57w. Dry. TD 6,496 ft.

Pawnee Buttes area, Shamrock Oil & Gas Co. 1 Younglund, SE SE NE 34-11n-58w. Dry. TD 7,185 ft. "J" sand 7,043 ft.

MANITOBA

Anglo American 4-30 Birdtail, LSD 4, 30-18-26w1. Dry. TD 3,350 ft.

SASKATCHEWAN

Shell Oil Co. A-10-15 Bergfield, LSD 10, 15-2-21w2. Dry. TD 5,502 ft.

Socony-Sohio 1 Crystal Hills, LSD 3, 14-10-24w2. Dry. TD 6,311 ft.

Amurex-Trans Empire-Co-op 1 Benson, LSD 1, 11-9-25w3. Dry. TD 5,372 ft.

Socony-Woodley-Southern 17-13 Eastbrook, LSD 13, 17-4-21w3. Dry. TD 5,302 ft.

Imperial-Calvan 5-21 Fox Valley, LSD 5, 21-18-26w3. Dry. TD 3,348 ft.

L. D. C. 1 Best, LSD 15, 24-52-28w3. Dry. TD 1,601 ft.

Socony-Woodley-Southern 3-1 Southeast Midway, LSD 1, 3-14-19w3. Jurassic sand oil well. TD 3,800 ft.

Imperial-Tide Water 13-25 Oakshela, LSD 13, 25-16-6w2. Dry. TD 3,255 ft.

Tide Water-Parkbeg 2 Crown, LSD 13, 8-15-3w3. Dry. TD 4,425 ft.

Socony-Woodley-Southern 20-4 Sandhills, LSD 4, 20-18-24w3. Dry. TD 2,969 ft.

Shell Oil Co. 6 Wood Mountain, LSD 14, 13-2-7w3. Dry. TD 5,443 ft.

Shell 7 Wood Mountain, LSD 12, 30-3-10w3. Dry. TD 4,705 ft.

ALBERTA

Western-Redwater-Merrill 12-25 Calvan, LSD 12, 25-34-10w4. Viking sand oil well. TD 2,950 ft.

Roberts & Associates 1 Morinville, LSD 10, 19-55-25w4. Cretaceous sand gas well. TD 4,675 ft.

Texaco 1-A Ponoka, LSD 3, 24-43-26w4. Basal quartz sand gas well. TD 7,960 ft.

Richland 3 Ramriver, LSD 8, 2-37-11w5. Dry. TD 4,808 ft.

Calcana-Century 1 Monarch, LSD 16, 21-13-14w4. Bow Island sand gas well. TD 2,500 ft.

Amerada 32-13 Crown VF, LSD 10, 13-70-25w5. Gas well. PBTD 5,046 ft. TD 10,030 ft.

BRITISH COLUMBIA

Pacific 28 Fort St. John, LSD 9, 3-84-18w6. Dry. TD 4,192 ft.

British-American-Hudson's Bay 1 Lone Mountain, 62° 9' 40" N Latitude, 122° 55' 40" W Longitude. Dry. TD 2,870 ft.

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LEGAL

Notice is hereby given that sealed bids on oil and gas leases on 57,429.53 acres of allotted and Tribal Indian lands on the Fort Peck Indian Reservation will be opened at 2:00 o'clock P.M., Mountain Standard Time, August 25, 1953, in the office of the Superintendent, Fort Peck Indian Agency, Poplar, Montana. Those individuals desiring specific information in connection with this sale of leases may contact Mr. James D. Crawford, Superintendent, Fort Peck Agency, Poplar, Montana.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that the SW¼NE¼, N½NW¼SE¼ sec. 32, T. 12 N., R. 23 W., S.B.M., California, within the known geologic structure of the Sunset field, will be offered in one parcel for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre, at 1 p.m., Eastern Standard Time, September 23, 1953, when bids will be opened. Details of the lease offering and how and where to submit bids may be obtained upon request from the Manager of the Land Office, Los Angeles, California, or from the Bureau's Washington office. L. E. Hoffman, Chief, Division of Minerals.

LEGAL

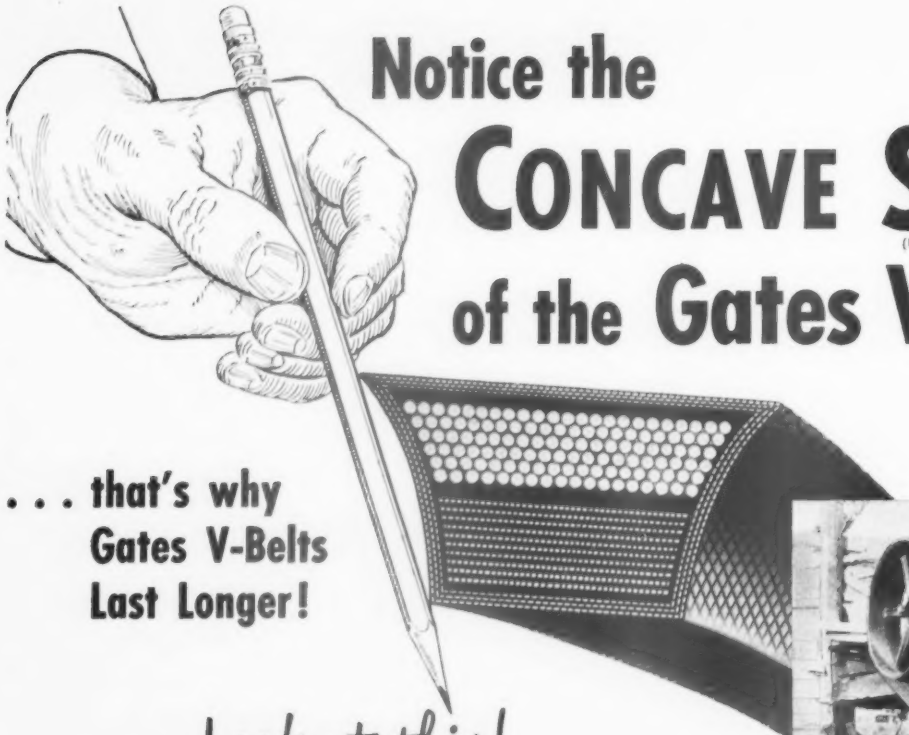
U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that approximately 1168 acres of lands within the known geologic structure of the Bunker Hill field, Carbon County, Wyoming, will be offered for oil and gas leasing in eight separate parcels to the qualified bidder of the highest cash amount per acre, at 1 p.m., E.S.T. on September 30, 1953, when bids will be opened. Details of the lease offering, how and where to submit bids, and a description of the lands may be obtained upon request from the Manager of the Land and Survey Office, Cheyenne, Wyoming, or from the Bureau's Washington office. L. E. Hoffman, Chief, Division of Minerals.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that approximately 1,780 acres of land in T. 29 N., Rs. 12 W. and 13 W., and T. 30 N., R. 6 W., N.M.P.M., within the known geologic structure of the San Juan field, New Mexico, will be offered in 7 parcels for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1 p.m., Eastern Standard time, September 16, 1953, when bids will be opened. Details of the lease offering, how and where to submit bids, and a description of the lands may be obtained upon request from the Manager of the Land and Survey Office, Santa Fe, New Mexico, or from the Bureau's Washington Office. L. E. Hoffman, Chief, Division of Minerals.

LEGAL

THE ADMINISTRATOR, BUREAU OF LAND MANAGEMENT, U. S. DEPARTMENT OF THE INTERIOR, Washington 25, D. C., subject to the provisions of Public Land Order 860 of August 12, 1952, offers through sealed bids at a cash bonus per acre, an oil and gas lease for 212.24 acres within the Smolan oil field and comprising the warehouse site of the Smoky Hill Air Force Base, Saline County, Kansas. Bids are to be opened in the office of the Administrator at 1 p.m., E.S.T. September 30, 1953. These same lands were recently offered for oil and gas leasing through competitive bidding, but the lease sale has been annulled. Copies of the form of lease and pertinent information will be mailed upon request or may be obtained from the Oil and Gas Supervisor, U. S. Geological Survey, Post Office Building, Tulsa, Oklahoma. Each bidder must submit 1/5 of the amount bid in cash, Cashier's check, certified check, or money order, payable to the Treasurer of the United States. Envelopes containing bids should be plainly marked that they are not to be opened before the date and hour set out herein and should show the area involved in this sale. The lease will provide for a royalty of 12½ per cent and an annual rental or minimum royalty of $1 per acre. Prior to issuance of the lease the successful bidder will be required to pay the remainder of the bonus and the first year's annual rental, to furnish an acceptable surety bond in the sum of $15,000 and to qualify as to citizenship as prescribed for leases under the Mineral Leasing Act of August 8, 1946 (60 Stat. 950; 30 U.S.C. 181). The Department reserves the right to reject any and all bids.



Notice the CONCAVE SIDES of the Gates V-Belt-

(U.S. PATENT NO. 1813698)

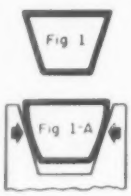
. . . that's why Gates V-Belts Last Longer!

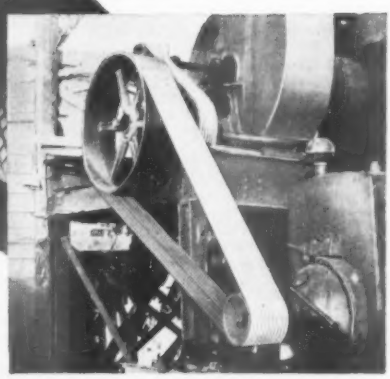
Look at this!

In *half a minute* you can prove for yourself the belt-saving advantage of the CONCAVE SIDES.

Take any *straight-sided* V-Belt (Fig. 1) and bend it as it bends in going around its pulley. At the same time, grip its sides with your fingers and *feel* those sides *bulge out* as in Fig. 1-A.

Clearly, those bulging sides will press *unevenly* against the V-pulley—and this causes extra wear at the points shown by the arrows (Fig 1-A).





Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

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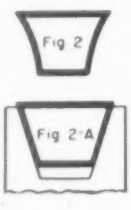
These sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the full width of the Gates Vulco Rope—and this means *longer* belt life and *lower* belt costs for you!



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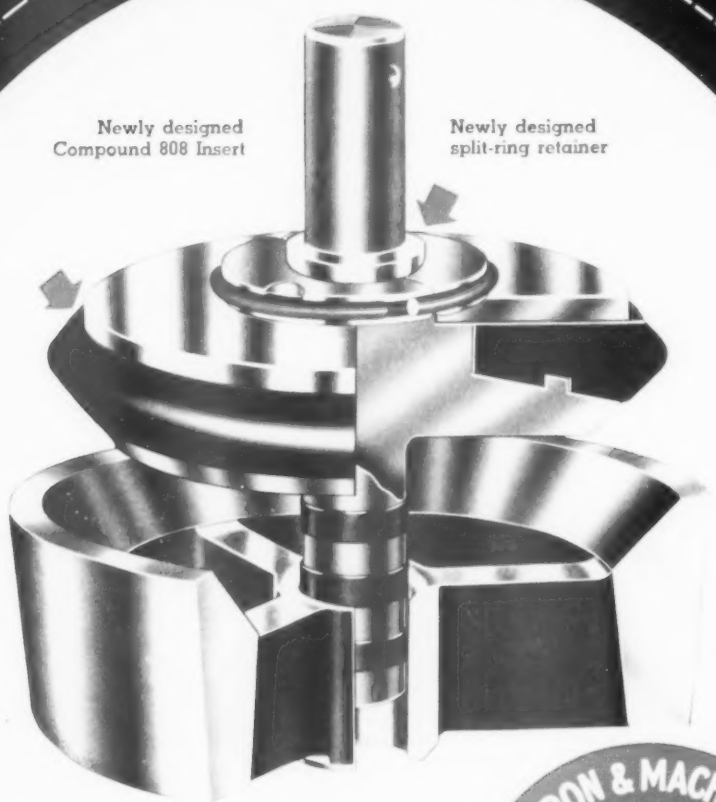

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